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# Scale Economies, Scale Externalities: Hog Farming and the Changing American Agricultural Industry

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Scale Economies, Scale Externalities:  
Hog Farming and the Changing  
American Agricultural Industry

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ABSTRACT

American agriculture is inexorably concentrating into the hands of a small number of large conglomerates. Expanding farms pursuing scale economies would normally have to abide by a system of environmental and other laws that would, in theory, require farms to account for negative externalities. If those laws were observed and

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enforced, they would help strike a balance between the greater profitability and the larger externalities of scaling up. But these laws are not widely observed nor rigorously enforced, which upsets this balance and gives large-scale farms a cost advantage while insulating them from corresponding responsibilities.

Perhaps nowhere in agriculture is this tension more visible than in the hog industry, which has dramatically transformed itself from one based on small-scale, localized production to one based on large-scale, far-flung production. Ninety-six percent of all hogs raised in the United States are now raised on farms of one thousand or more hogs. Thus far, however, the American legal and regulatory systems have not appropriately managed this staggering growth. Lax enforcement of environmental laws against large hog farms has allowed them to grow and realize scale economies without accounting for their exponential increase in water and air pollution. The same can be said for state right-to-farm laws, which insulate many large hog farms from nuisance lawsuits. Further, reckless practices in concentrated animal feeding operations contribute to the development of dangerous antibiotic-resistant bacteria and heighten the risk of a transfer of zoonotic diseases to humans—potentially helping to set the stage for the next pandemic. Finally, the risks of this lax legal structure are not only related to environmental and health concerns. The concentration of hog farming imposes economic costs by reducing competition and variety, all in the pursuit of lower consumer prices that may or may not be actually achieved in the long run. Large agricultural conglomerates should be held to account for these enormous costs, not only because these costs outweigh the productivity benefits, but also because they serve to marginalize small farmers and fundamentally change the nature of farming.

#### INTRODUCTION

American agriculture is changing at an astonishing pace. While agricultural production historically took place on a vast, sprawling potpourri of independent farms, the engine of modern production is a consolidated network of efficient, cost-conscious, and interrelated operations. No longer predominantly small and family-run, farms are now more typically managed by large and sophisticated business organizations with many key decisions made at corporate headquarters, far removed from the farm itself. American agriculture has taken on qualities that are considerably more industrial than its

less mechanized past. As part of this process, agricultural production has also become concentrated in large and sophisticated business organizations. In terms of production, the iconic small, independent family farm has become a mere souvenir of American history.

What accounts for this increasing industrialization and concentration of agricultural production? Certainly part of it is the natural economic evolution of an industry, as it realizes efficiencies and economies of scale.<sup>1</sup> And at least part of the trend can be attributed to continuing American agricultural policy centering upon subsidies. Not only are agricultural subsidies allocatively inefficient,<sup>2</sup> but they have contributed to the historic concentration of the agricultural sector as small-scale farms are replaced by larger, scale-intensive farms.<sup>3</sup> It is not merely that subsidy payments are

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<sup>1</sup> CAROLYN DIMITRI ET AL., U.S. DEP'T OF AGRIC. ECON. RESEARCH SERV., THE 20TH CENTURY TRANSFORMATION OF U.S. AGRICULTURE AND FARM POLICY 6 (2005), [http://www.ers.usda.gov/media/259572/eib3\\_1\\_.pdf](http://www.ers.usda.gov/media/259572/eib3_1_.pdf).

<sup>2</sup> See, e.g., Daron Acemoglu & James A. Robinson, *Inefficient Redistribution*, 95 AM. POL. SCI. REV. 649, 649 (2001) ("In all these cases, it is difficult to argue that the particular form of the policy is correcting a market failure. Rather, it seems aimed simply at redistributing income. For instance, no scholars appear to argue that price supports for farmers, which have the effect of increasing farm output, promote efficiency because without them there would be too few resources in agriculture. . . . Instead, it is widely agreed that price supports are simply a way to raise farmers' incomes. If this is correct, then they are Pareto inefficient in the sense that farm incomes could be maintained, and everyone else made better off, by a form of redistribution that did not involve resource misallocation. A simple transfer to raise the income of the farmers by as much as the inefficient policy yields would constitute an actual Pareto improvement."); Wilfrid Legg, *Presidential Address Agricultural Subsidies: Measurement and Use in Policy Evaluation*, 54 J. AGRIC. ECON. 175, 177 (2003) ("The result was a major OECD study, *National Policies and Agricultural Trade*, published in 1987, which led to Ministers agreeing in that same year to a set of actions and principles for the reform of agricultural policies. Countries agreed to progressively reduce agricultural subsidies and allow for a greater influence of market signals in guiding production decisions, while recognising [sic] that countries might also need to take non-economic objectives into account. Forging consensus among countries on the sensitive issue of agricultural policy reform in an international context is a painstaking process. The agreement to cut subsidies, coupled with the powerful signal to increase the 'market orientation' of agriculture was qualified by the potential catch-all of the option to take 'non-economic objectives' into account." (footnote omitted)); Gordon C. Rausser, *Predatory Versus Productive Government: The Case of U.S. Agricultural Policies*, 6 J. ECON. PERSP. 133, 135 (1992) ("[M]uch of this [agricultural] legislation became a vehicle for codifying rent-seeking behavior. Examples of such agricultural policy evolution briefly described here include western resource and water development, soil conservation, environmental pesticide policy, and farm credit.").

<sup>3</sup> See, e.g., LAURENT PIET ET AL., HOW DO AGRICULTURAL POLICIES INFLUENCE FARMLAND CONCENTRATION? THE EXAMPLE OF FRANCE 2-3 (2010), [https://www.researchgate.net/publication/46471353\\_How\\_do\\_agricultural\\_policies\\_influence\\_farm](https://www.researchgate.net/publication/46471353_How_do_agricultural_policies_influence_farm)

concentrating in fewer hands as the logical result of there being fewer hands to receive them. Rather, agricultural subsidies themselves are actively precipitating the rise of mega-farms at the expense of small farms.<sup>4</sup> A U.S. Department of Agriculture (USDA) economic study found that between 1987 and 2002, one-third to one-half of all farm concentration could be attributed to government subsidies.<sup>5</sup> That is to say, without government subsidies, farm concentration would still be occurring, but more slowly.

If agricultural subsidies account for one-third to one-half of concentration, what accounts for the rest? Missing from this economic discussion is the role of law in creating an increasingly concentrated agricultural sector. Generous and inefficient federal subsidies are only a part of the policy machinery that grinds small farms down to novelty status and paves the way for large agricultural conglomerates to take up the lost productive capacity. Legal rules—or more accurately, the lack thereof—have contributed to concentration by allowing large farms to take advantage of scale economies while externalizing the costs of their larger, bulked-up operations. Large farms enjoying scale economies make larger profits. Normally these farms would also have to abide by a system of land use, environmental, and other laws requiring them to account for their social and environmental costs. If those laws were observed and enforced, they would help strike a balance between greater profitability and larger externalities. But these laws are not widely observed and not rigorously enforced, upsetting this balance and giving large-scale farms cost advantages while insulating them from corresponding responsibilities.

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land\_concentration\_The\_example\_of\_France (discussing similar effects of similar policies in France); Michael J. Roberts & Nigel Key, *Agricultural Payments and Land Concentration: A Semiparametric Spatial Regression Analysis*, 90 AM. J. AGRIC. ECON. 627, 640 (2008); Simone Severini & Antonella Tantari, *The Impact of Agricultural Policy on Farm Income Concentration: The Case of Regional Implementation of the CAP Direct Payments in Italy*, 44 AGRIC. ECON. 275, 284 (2013) (concluding that a direct payment policy reduced the concentration of farm ownership caused by past agricultural subsidies); Justin Spittler et al., *The Economic Impact of Agricultural Subsidies in the United States*, 36 J. SOC. POL. & ECON. STUD. 301, 305 (2011).

<sup>4</sup> Nigel D. Key & Michael J. Roberts, *Do Government Payments Influence Farm Size and Survival?*, 32 J. AGRIC. & RESOURCE ECON. 330, 346 (2007) (“Government payments were found to be positively associated with the likelihood of farm survival, and the magnitude of this association was generally greater for larger farms. Also, a small but statistically significant positive association was found between payments and farm size growth, and the magnitude of this effect increased with the size of the operation.”); Roberts & Key, *supra* note 3, at 627.

<sup>5</sup> Roberts & Key, *supra* note 3, at 640.

Perhaps nowhere in agriculture are these trends more visible than in the hog industry. Over the past three decades, the American hog industry has undergone a remarkable transformation from one based on small-scale, localized production to one based on large-scale, decentralized production.<sup>6</sup> American hog farming has become concentrated in the sense that a handful of large corporations now own the vast majority of hogs raised in the United States.<sup>7</sup> But hog farming has also become decentralized in the sense that different phases of hog raising are now frequently delegated to different farms. Instead of raising a hog from birth to slaughter, large livestock conglomerates contract out different phases of hog production to individual hog farms, but maintain tight control over the entire process from birth to slaughter to processing to marketing.<sup>8</sup> This has achieved some gains in efficiency because different phases of hog raising require slightly different sets of expertise. This modern and newly efficient American hog industry has produced record-low consumer prices<sup>9</sup> and become an export juggernaut, elevating the United States from a bit player in international markets to the largest pork exporter in the world.<sup>10</sup>

The massive scaling-up of hog production, however, has come with a heavy environmental and social price tag. The restructuring of hog production to occur almost exclusively on large, industrialized, concentrated animal feeding operations (CAFOs),<sup>11</sup> has introduced a number of environmental problems that were insignificant when production was dominated by smaller farms.<sup>12</sup> Farms expanding to take advantage of economies of scale are able to lower their average

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<sup>6</sup> PEW COMM'N ON INDUS. FARM ANIMAL PROD., PUTTING MEAT ON THE TABLE: INDUSTRIAL FARM ANIMAL PRODUCTION IN AMERICA 5–6 (2008) [hereinafter PEW], [http://www.ncifap.org/\\_images/PCIFAPFin.pdf](http://www.ncifap.org/_images/PCIFAPFin.pdf).

<sup>7</sup> *Id.* (The chicken industry is even more integrated and concentrated than hog farms, whereas the dairy and beef cattle industries are less so.).

<sup>8</sup> WILLIAM D. MCBRIDE & NIGEL KEY, U.S. DEP'T OF AGRIC. ECON. RESEARCH SERV., U.S. HOG PRODUCTION FROM 1992 TO 2009: TECHNOLOGY, RESTRUCTURING, AND PRODUCTIVITY GROWTH 5–8 (2013), <http://www.ers.usda.gov/media/1207987/err158.pdf>.

<sup>9</sup> *Id.* at 33–34.

<sup>10</sup> *Hogs & Pork: Pork Exports*, U.S. DEP'T OF AGRIC. ECON. RESEARCH SERV., <http://www.ers.usda.gov/topics/animal-products/hogs-pork/trade.aspx#exports> (last updated Mar. 24, 2015).

<sup>11</sup> *Regulatory Definitions of Large CAFOs, Medium CAFO, and Small CAFOs*, U.S. ENVTL. PROT. AGENCY, [http://www.epa.gov/npdes/pubs/sector\\_table.pdf](http://www.epa.gov/npdes/pubs/sector_table.pdf) (last visited Oct. 23, 2015) (providing working definitions of what constitutes a CAFO).

<sup>12</sup> See discussion *infra* Part II.

costs as production volume increases.<sup>13</sup> But the opposite is true of the harm from pollution. Pollution costs increase exponentially with volume, so that the *marginal* harm from the five thousandth cow, hog, or chicken is greater than that from the tenth cow, hog, or chicken.<sup>14</sup> Farm size expansion is thus a mixed bag of higher profits and greater social harms. Environmental and land use laws are supposed to provide a check on the uncontrolled growth of livestock operations, ensuring that the negative externalities of larger livestock farms are commensurate with the economic benefits. But these environmental and land use laws have been neutered and their countervailing influences erased, allowing large livestock operations, such as hog CAFOs, to flourish.

The forgiveness of these environmental insults is a matter of common agricultural and environmental policy<sup>15</sup> as well as an obvious subsidy for large hog CAFOs. What is less obvious is that environmental laxity, as applied to large hog CAFOs, actually *injures* smaller hog farms and is helping to drive them out of existence. Most individual hog farmers have become outside contractors, providing the large firms with facilities and waste management services, but little of the knowledge and animal husbandry that characterized traditional hog farming. The implicit legal bias towards large CAFOs has marginalized all operations that do not fall under this category. Under the patina of defending the bucolic farm life, large agricultural conglomerates have actually decimated farming life to make room for CAFOs. Nowhere has this been more sharply illustrated than in hog farming.

This Article examines five areas of law which have biased hog production towards larger, more intensive farms: (1) state right-to-farm laws, (2) the Clean Water Act, (3) the Clean Air Act, (4) Food

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<sup>13</sup> ROBERT A. HOPPE ET AL., U.S. DEP'T OF AGRIC. ECON. RESEARCH SERV., SMALL FARMS IN THE UNITED STATES: PERSISTENCE UNDER PRESSURE 28 (2010), [http://www.ers.usda.gov/media/147007/eib63\\_1\\_.pdf](http://www.ers.usda.gov/media/147007/eib63_1_.pdf).

<sup>14</sup> See, e.g., David Letson et al., *Point/Nonpoint Source Trading for Controlling Pollutant Loadings to Coastal Waters: A Feasibility Study*, in *THEORY, MODELING AND EXPERIENCE IN THE MANAGEMENT OF NONPOINT-SOURCE POLLUTION* 123, 127 (Clifford S. Russell & Jason F. Shogren eds., 1993) (modeling the convex damage function); James S. Shortle & James W. Dunn, *The Relative Efficiency of Agricultural Source Water Pollution Control Policies*, 68 AM. J. AGRIC. ECON. 668, 670 (1986) (modeling a water quality damage function as being convex, or increasing nonlinearly); Rodney B.W. Smith & Theodore D. Tomasi, *Transaction Costs and Agricultural Nonpoint-Source Water Pollution Control Policies*, 20 J. AGRIC. & RES. ECON. 277, 279 (1995) (assuming convex water quality damage function).

<sup>15</sup> See discussion *infra* Part II.

and Drug Administration oversight of the administration of antibiotics to farm animals, and (5) the Packers and Stockyards Act. Each of these areas of law has its own focus, with its own regulatory sphere that somehow touches on the production of livestock. And agricultural interests in each of these areas have successfully lobbied to essentially be left alone, carrying out agricultural operations as they see fit, without regulatory or private interference. The resulting free-for-all in a regulatory vacuum has created a hog industry that is highly concentrated, politically organized, and brutal in defending its economic position.

This Article proposes a reform agenda centered upon the economic effects that each of these five areas of law have on the industrialization of hog production. Part I of this Article sets out a brief description and history of the hog industry, with attention towards productivity and externalities. Part II of this Article sets out the five different areas of law that have abetted concentration in the hog industry through legal policies which tend to overlook the harms caused by large hog farms. Part III of this Article presents some normative arguments for not only halting, but reversing, some of the concentration that has occurred in the hog industry over the past two decades. This Article then concludes with some general observations about hog farming, agriculture, and trends towards industry concentration.

## I

### THE HOG INDUSTRY

The hog industry has never been glamorous, but it has long been an important component of the American livestock industry.<sup>16</sup> In 2012, over twenty billion pounds of pork and pork products were produced<sup>17</sup> from hogs raised on about sixty thousand hog farms in the

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<sup>16</sup> See generally *Per Capita Consumption of Poultry and Livestock, 1965 to Estimated 2016*, in *Pounds*, NAT'L CHICKEN COUNCIL, <http://www.nationalchickencouncil.org/about-the-industry/statistics/per-capita-consumption-of-poultry-and-livestock-1965-to-estimated-2012-in-pounds> (comparing consumption rates of commonly eaten meats) (last updated July 10, 2015).

<sup>17</sup> *Pork: Supply and Disappearance (Carcass Weight, Million Pounds) and Per Capita Disappearance (Pounds)*, U.S. DEP'T OF AGRIC., ECON. RES. SERV., [http://www.ers.usda.gov/datafiles/Livestock\\_Meat\\_Domestic\\_Data/Quarterly\\_red\\_meat\\_poultry\\_and\\_egg\\_supply\\_and\\_disappearance\\_and\\_per\\_capita\\_disappearance/Pork/WASDE\\_PorkFull.pdf](http://www.ers.usda.gov/datafiles/Livestock_Meat_Domestic_Data/Quarterly_red_meat_poultry_and_egg_supply_and_disappearance_and_per_capita_disappearance/Pork/WASDE_PorkFull.pdf) (last updated Oct. 27, 2015) [hereinafter *Pork Supply and Disappearance*].



United States.<sup>18</sup> American pork production, taking into account the cyclical nature of agricultural commodities, has increased fairly steadily at an average rate of 1.25% per year from 1970.<sup>19</sup> Inventory of live hogs in the United States has also ticked upward, from about fifty-three million in 1969<sup>20</sup> to just over sixty-six million in 2012—an average increase of about 0.5% per year.<sup>21</sup> That production has increased more quickly than inventory, reflecting the industrial trend of producing larger hogs for slaughter.<sup>22</sup>

These unspectacular trend figures, however, mask the stunning transformation of the hog industry from small-scale production to large-scale production. In 1969, only 7% of all hogs were on farms of a thousand or more hogs.<sup>23</sup> In 2012, that figure had risen to almost 96%.<sup>24</sup> From 1969 to 2012, the number of hog farms in the United States fell by seven-eighths, while hog production steadily increased.<sup>25</sup> Hog farming has become intensely concentrated: almost three thousand farms had *five thousand or more hogs*—a category that did not even exist in 1992.<sup>26</sup> One hundred and thirty hog owners—0.2% of all hog owners—collectively own 57% of all hogs.<sup>27</sup>

Perhaps nothing symbolizes the industrialization and concentration of hog farming as much as the trend towards contract farming. Most individual hog farmers no longer own the hogs they handle. In 1992, only 3% of all inventoried hogs in the United States were being raised under a contractual arrangement; now that number is 71%.<sup>28</sup> Vertically integrated corporations—ones that assume the entire production and marketing undertaking—own the hogs<sup>29</sup> and contract

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<sup>18</sup> U.S. DEP'T OF AGRIC., 2012 CENSUS OF AGRICULTURE – STATE DATA 359–66 tbl.12 (2014) [hereinafter USDA 2012 CENSUS], [http://www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_2\\_US\\_State\\_Level/st99\\_2\\_012\\_012.pdf](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_US_State_Level/st99_2_012_012.pdf).

<sup>19</sup> *Pork Supply and Disappearance*, *supra* note 17. Calculations derived from the data are on file with the author.

<sup>20</sup> USDA 2012 CENSUS, *supra* note 18, at 359–66 tbl.12. Calculations derived from the data are on file with the author.

<sup>21</sup> *Id.*

<sup>22</sup> *Id.*

<sup>23</sup> *Id.*

<sup>24</sup> *Id.*

<sup>25</sup> In 1969, there were over 532,000 hog farms in the United States; in 2012, there were about 63,000. *Id.*

<sup>26</sup> MCBRIDE & KEY, *supra* note 8, at 10.

<sup>27</sup> *Id.* at 4.

<sup>28</sup> *Id.* at 14.

<sup>29</sup> Betsy Freese, *Pork Powerhouses 2010: Back in Black*, AGRICULTURE.COM (Sept. 17, 2010, 11:05 AM), <http://www.agriculture.com/livestock/pk-powerhouses-2010-back-in>

with individual farmers<sup>30</sup> to handle a particular phase of hog rearing under very specific parameters set out by the corporation.<sup>31</sup> A typical production contract might provide that an integrated firm will deliver a certain number of hogs on a certain date,<sup>32</sup> and that the firm will provide “general instructions with respect to the care and husbandry of [hogs].”<sup>33</sup> It typically requires the contractor to agree to acknowledge receipt of, and to comply with the requirements of a hog “handbook.”<sup>34</sup> The firm retains rights of inspection, and contractors agree to forbid access to the hogs unless approved by the firm.<sup>35</sup> Feed and veterinary services are supplied to the contractor from the corporation exclusively.<sup>36</sup> Contractors are prohibited from going outside of the corporation for anything affecting the welfare of the hogs.<sup>37</sup> Unmistakably, large livestock conglomerates have taken charge of the production process. For their efforts, they have been able to achieve clear gains in efficiency.<sup>38</sup>

Contract farming implies a vertically integrated production process. The point of contract farming from the perspective of the integrated firm is to eliminate the variability in production, pool risks, and to be able to optimize production from birth to slaughter to processing to marketing.<sup>39</sup> A vertically integrated firm pools information in a way that would be extremely difficult for a network of hog farmers to do. For example, it is difficult for an individual hog farmer to find the best breeding boars and sows from among hundreds of thousands, translate anticipated future market conditions into

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-black\_275-ar9803. Smithfield Foods, the largest hog conglomerate, owns about nine hundred thousand breeding sows, *see id.*, and fifteen million hogs overall. Eliza Barclay, *Smithfield Prods Its Pork Suppliers to Dump Pig Crates*, NPR: THE SALT (Jan. 7, 2014, 11:57 AM), <http://www.npr.org/blogs/thesalt/2014/01/07/260439063/smithfield-prods-its-pork-suppliers-to-dump-pig-crates>.

<sup>30</sup> Barclay, *supra* note 29. Smithfield Foods has approximately twenty-one hundred contracts. *Id.*

<sup>31</sup> Nigel Key & William McBride, *Production Contracts and Productivity in the U.S. Hog Sector*, 85 AM. J. AGRIC. ECON. 121, 121 (2003).

<sup>32</sup> *E.g.*, Contract, Christensen Farms & Feedlots, Inc. cl. 4.C (Mar. 14, 2001) (on file with author).

<sup>33</sup> *Id.* at cl. 3.C.

<sup>34</sup> *Id.* at cl. 4.K.

<sup>35</sup> *Id.* at cl. 5.

<sup>36</sup> *Id.* at cl. 3.C.

<sup>37</sup> *Id.* at cl. 6.A.

<sup>38</sup> Key & McBride, *supra* note 31, at 121.

<sup>39</sup> *Id.* at 122.

production decisions, and shuttle hogs among a network of farms to minimize transportation costs. Vertically integrated firms exercise tight control over feed administered to their hogs, which provides uniformity but also offers an opportunity to experiment with different feed mixtures (such as adding antibiotics for growth promotion purposes).<sup>40</sup> By virtue of their size, vertically integrated firms are able to ferret out the best price for feed—the largest cost of hog farming.<sup>41</sup>

Vertical integration ironically breaks up hog farming into different stages. Traditional “farrow-to-finish”<sup>42</sup> hog farms birthed piglets on the farm and raised them to slaughter weight, feeding them corn and soybean that was grown on the farm itself. Hogs were traditionally sold at local markets, which were in turn connected to larger distribution networks.<sup>43</sup> Meanwhile, the modern, vertically integrated farming operation may have one type of hog farm that breeds hogs, another that farrows piglets and weans them, and another that fattens them to slaughter weight.<sup>44</sup> Then, the hogs are sent to an in-house slaughterhouse that is operated to accept hogs at just the right time so as to operate at near capacity.<sup>45</sup> This separation of hog-raising phases has allowed livestock conglomerates to realize efficiencies by specialization. Individual hog farmers have, by specializing in a particular phase, become marginally more proficient at breeding, weaning, or finishing, and thus marginally more effective as hog farmers.<sup>46</sup> Slaughterhouses, as well, have grown in size and specialization—segregating slaughter into different types of pork cuts and products—to further take advantage of economies of scale and

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<sup>40</sup> See discussion *infra* Part II.D.

<sup>41</sup> MCBRIDE & KEY, *supra* note 8, at 15; Timothy A. Wise & Sarah E. Trist, *Buyer Power in the U.S. Hog Markets: A Critical Review of the Literature* (Glob. Dev. & Env’t Inst., Working Paper No. 10-04, 2010), <http://www.ase.tufts.edu/gdae/Pubs/wp/10-04HogBuyerPower.pdf>.

<sup>42</sup> Farrow-to-finish is typically a confinement operation where hogs are bred and raised to their slaughter weight, usually 225–300 pounds. Facilities with a capacity of 2500 or more swine are considered by the EPA to be CAFOs subject to point source pollution permit requirements. Other types of hog operations include farrow-to-feeder pig, feeder pig-to-finish, weanling-to-feeder pig, and farrow-to-weanling. WILLIAM D. MCBRIDE & NIGEL KEY, U.S. DEP’T OF AGRIC. ECON. RESEARCH SERV., AGRIC. ECON. REPORT NO. 818, ECONOMIC AND STRUCTURAL RELATIONSHIPS IN U.S. HOG PRODUCTION 2 (2003), [http://www.ers.usda.gov/media/488755/aer818\\_1\\_.pdf](http://www.ers.usda.gov/media/488755/aer818_1_.pdf).

<sup>43</sup> MCBRIDE & KEY, *supra* note 8, at 5.

<sup>44</sup> JAMES M. MACDONALD, ET AL., U.S. DEP’T OF AGRIC., ECON. RESEARCH SERV., AGRIC. ECON. REPORT NO. 785, CONSOLIDATION IN U.S. MEATPACKING 6 (2000), [http://www.ers.usda.gov/media/493235/aer785\\_1\\_.pdf](http://www.ers.usda.gov/media/493235/aer785_1_.pdf).

<sup>45</sup> *Id.*

<sup>46</sup> MCBRIDE & KEY, *supra* note 8, at 1.

further reduce costs.<sup>47</sup> Notoriously volatile spot markets, the traditional means of marketing finished hogs, now account for only 8% of sales, down from 62% in 1994.<sup>48</sup> Spot markets also happen to be how most small hog farms market their finished hogs.<sup>49</sup>

The pursuit of economies of scale drives this supersizing and specialization of hog operations.<sup>50</sup> The difference can be dramatic: among farrow-to-finish operations that raise hogs from birth to slaughter, a farm of less than five hundred hogs incurred operating expenses more than twice that of farms with five thousand or more hogs.<sup>51</sup> That large of a gap effectively consigns anything less than a mega-farm, or very large CAFO, to supplying “niche” pork markets, where consumers are willing to pay a premium for hogs raised in more humane conditions or produce fewer environmental problems.<sup>52</sup>

Outside of niche markets, profit margins in hog farming are tantalizingly small—but narrow advantages multiplied over large volumes of hogs translate into potentially decisive competitive advantages. For example, feeder-to-finish operations, which take weaned hogs and fatten them to slaughter weight, yield a relatively small cost advantage for operations with five thousand or more hogs over those with fewer than five hundred hogs: roughly a 20% cost savings. But that is enough to have driven most production on feeder-to-finish farms onto larger farms.<sup>53</sup>

The late Nobel Laureate economist Ronald Coase wrote in 1937 that the nature of a firm was to reduce the transaction costs of doing business.<sup>54</sup> Internalizing different aspects of production could save a

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<sup>47</sup> MACDONALD ET AL., *supra* note 45, at 5–6.

<sup>48</sup> Glenn Grimes & Ron Plain, *U.S. Hog Marketing Contract Study* tbl.1 (Univ. of Mo. Dep’t of Agric. Econ., Working Paper AEWP 2009-1, 2009), <http://agebb.missouri.edu/mkt/vertstud09.htm>.

<sup>49</sup> DOUG GURIAN-SHERMAN, UNION OF CONCERNED SCIENTISTS, CAFOS UNCOVERED: THE UNTOLD COSTS OF CONFINED ANIMAL FEEDING OPERATIONS 22 (2008), [http://www.ucsusa.org/sites/default/files/legacy/assets/documents/food\\_and\\_agriculture/cafos-uncovered.pdf](http://www.ucsusa.org/sites/default/files/legacy/assets/documents/food_and_agriculture/cafos-uncovered.pdf).

<sup>50</sup> MCBRIDE & KEY, *supra* note 42, at 1 (“Economies of size are a form of cost variation among farms based on the premise that larger farms have lower per unit costs than smaller farms. Therefore, farms will become larger over time as smaller farms exit the industry or expand to take advantage of lower costs.”).

<sup>51</sup> MCBRIDE & KEY, *supra* note 8, at 12.

<sup>52</sup> Peter J. Lammers et al., *Foreword* to NICHE PORK PRODUCTION (2007), <http://www.ipic.iastate.edu/publications/IPICNPP.pdf>.

<sup>53</sup> MCBRIDE & KEY, *supra* note 8, at 11 tbl.2 (showing that feeder-to-finish hog farms averaged 7222 hog sales or removals in 2009).

<sup>54</sup> See generally R.H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* 386 (1937).

firm costs by dispensing with partners that may or may not be reliable or forthright or that may harbor different assumptions about the transaction.<sup>55</sup> Coase certainly did not have the hog industry in mind, but its evolution serves as an elegant example of transaction cost economics, the field that Coase's works have spawned.<sup>56</sup> The hog industry is an apt example of an industry trying to minimize transaction costs. While the hog industry has not become one gigantic firm, it has moved in that direction with its vertical integration model. The hog industry will never be able to completely insulate itself from commodity price fluctuations or weather-induced losses, but it can diversify its risk and control just about every aspect of hog production by integrating production under one central clearinghouse. Livestock conglomerates, possessing a menu of productivity-improving and risk-spreading techniques, have sought to bring far-flung operations in-house, or contractually secured cooperation in incorporating those techniques into hog production. The result is an industry that has drastically reduced the uncertainty involved with hog farming, and lowered a wide array of transaction costs associated with the production of a notoriously volatile commodity.

At first glance, the newly efficient and highly concentrated hog industry would appear to have a smaller footprint than the traditional, small-scale, farrow-to-finish farm. The loss of almost half of a million hog farms has likely released hundreds of thousands of acres of land to other uses, some of them other farm uses.<sup>57</sup> But the impacts of the new, supersized CAFOs extend well beyond property lines. Traditional farrow-to-finish hog farms were often part of larger, crop-growing farms, which raised a relatively small number of hogs. Hogs were fed surplus crops that were grown on that same farm, and hog manure was disposed of by spreading it on the adjoining, on-site crops. At such small scales, manure can be applied to growing crops without producing an excess that would spill off into nearby waterways during heavy rains. But the modern large hog CAFO

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<sup>55</sup> See *id.*

<sup>56</sup> See generally, e.g., R.H. Coase, *The Problem of Social Cost*, 3 J. L. & ECON. 1 (1960); Douglass C. North & John J. Wallis, *Integrating Institutional Change and Technical Change in Economic History a Transaction Cost Approach*, 150 J. INSTITUTIONAL & THEORETICAL ECON. 609 (1994); Stewart J. Schwab, *Coase's Twin Towers: The Relation Between The Nature of the Firm and The Problem of Social Cost*, 18 J. CORP. L. 359 (1993); Oliver E. Williamson, *Transaction Cost Economics: The Natural Progression*, 100 AM. ECON. REV. 673 (2010).

<sup>57</sup> See, e.g., Jacqueline Waymack, *Agricultural Preservation Techniques in Virginia*, 18 COLONIAL LAW. 11, 11 (1989).

generates far more manure than could be safely applied to on-site crops without polluting nearby waters.<sup>58</sup> Special handling is required, often by paying other farmers to accept their excess manure for crop fertilization.<sup>59</sup> Failing that, CAFOs may or may not fully comply with local, state, or federal laws regulating agricultural runoff. In terms of feed, the vertically integrated hog industry also relies on a sophisticated and calibrated system of feed supply that obtains feed off-site and transports it to individual contract hog farmers, generating a different mix for each stage of hog production.<sup>60</sup> That system of industrial feed production, which requires energy-intensive fertilizer and generates a transportation footprint, produces a wider and more harmful array of environmental effects.<sup>61</sup>

Large CAFOs are a creature not only of economics, but also legal policy. As they have emerged in the last four decades, they have not only transformed production and consumption of meat, but have also created a widening circle of environmental and social impacts. This Article catalogs those outsized environmental and social impacts, and shows how legal rules and institutions have largely given CAFOs a pass, allowing them to outcompete and displace smaller farms.

## II

### LEGAL POLICIES LEADING TO LARGER CAFOs

#### A. State Right-to-Farm Laws

In *Spur Industries, Inc. v. Del E. Webb Development Co.*, the Supreme Court of Arizona predictably held that a property developer could successfully recover in nuisance against a nearby foul-smelling cattle feedlot.<sup>62</sup> From a jurisprudential point of view, it was not even

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<sup>58</sup> MCBRIDE & KEY, *supra* note 8, at 36.

<sup>59</sup> “Excess” means the amount of manure that can be applied on adjoining crops without causing nutrient overloading. MARC RIBAUDO ET AL., U.S. DEP’T OF AGRIC., ECON. RESEARCH SERV., AGRIC. ECON. REPORT NO. 824, MANURE MANAGEMENT FOR WATER QUALITY COSTS TO ANIMAL FEEDING OPERATIONS OF APPLYING MANURE NUTRIENTS TO LAND 6 (2003), [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=757884](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=757884).

<sup>60</sup> See NIGEL KEY & WILLIAM MCBRIDE, U.S. DEP’T OF AGRIC., ECON. RESEARCH SERV., THE CHANGING ECONOMICS OF U.S. HOG PRODUCTION 9 (2007); Nigel Key, *Production Contracts and Farm Business Growth and Survival*, 45 J. AGRIC. & APPLIED ECON. 277, 278 (2013).

<sup>61</sup> It should be noted that the special feed is also more efficient in reducing hog waste. MCBRIDE & KEY, *supra* note 8, at 36.

<sup>62</sup> 494 P.2d 700, 707–08 (Ariz. 1972).

surprising that the plaintiff developer won despite actively expanding his retirement community towards the cattle feedlot, which had been operating for years. The “coming to the nuisance” defense has long been declared, in most states, to be an incomplete defense to a nuisance claim.<sup>63</sup> But the legislative backlash following *Spur Industries* took everyone by surprise. It was as if some inchoate discomfort with nuisance laws suddenly exploded into plain view, and the *Spur Industries* case became a fulcrum for political action to reverse, state-by-state, its holding.

Between 1976 and 1991, every single state and Puerto Rico passed some form of a right-to-farm (RTF) law.<sup>64</sup> To widely varying degrees, RTF laws provide farms with a defense to nuisance claims brought by plaintiffs that migrate toward—or “come to”—any allegedly nuisance-creating farm. RTF laws thus reverse a trend towards diminishing the importance of the coming to the nuisance defense.<sup>65</sup> While most commonwealth jurisdictions have relegated the coming to the nuisance defense to being just one factor in a multifactor analysis, RTF laws resurrect it as an absolute defense. At least with respect to farms, nuisance lawsuits have become considerably more difficult to win.<sup>66</sup>

RTF laws commonly set out some definition of the agricultural operations that can raise the defense, a list of permitted operational changes that can be undertaken without losing the defense, and some time limit that serves as an effective statute of limitations on any claims of nuisance against a farm. The stated purpose of RTF laws is to preserve agricultural lands and protect them against the encroaching sprawl of residential development.<sup>67</sup> Why should a cattle

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<sup>63</sup> See, e.g., *Jacques v. Pioneer Plastics, Inc.*, 676 A.2d 504, 508 (Me. 1996); *Mark v. Oregon ex rel. Dep’t of Fish & Wildlife*, 84 P.3d 155, 163 (Or. Ct. App. 2004).

<sup>64</sup> Neil D. Hamilton, *Right-to-Farm Laws Reconsidered: Ten Reasons Why Legislative Efforts to Resolve Agricultural Nuisances May Be Ineffective*, 3 DRAKE J. AGRIC. L. 103, 103–04 (1998).

<sup>65</sup> *Id.* at 104.

<sup>66</sup> See Jacqueline P. Hand, *Right-to-Farm Laws: Breaking New Ground in the Preservation of Farmland*, 45 U. PITT. L. REV. 289, 305 (1984) (“In enacting the right-to-farm laws, the various state legislatures have made the policy judgment that the social benefits of retaining land in agriculture are so critical that, rather than allowing courts to decide on a case-by-case basis whether an agricultural use is reasonable, the balance between agriculture and other uses should always be tipped toward agriculture.”).

<sup>67</sup> E.g., IND. CODE § 32-30-6-9(b) (2015) (“The general assembly declares that it is the policy of the state to conserve, protect, and encourage the development and improvement of its agricultural products. The general assembly finds that when nonagricultural land uses extend into agricultural areas, agricultural operations often become the subject of nuisance suits. As a result, agricultural operations are sometimes forced to cease

feedlot or hog farm that started out in the middle of nowhere have to continually worry about the approaching advance of property developers? It seemed not only grossly unfair, but counterproductive to make them dance around the whim and caprice of developers.

But RTF laws do not protect *all* agricultural lands. In *Parker v. Obert's Legacy Dairy*, an Indiana court heard a nuisance claim brought by one neighbor, an owner of a hobby farm, against another neighbor, a dairy farm that grew from 100 to 760 dairy cows in a single year.<sup>68</sup> The difference between the two farms is that defendant's farm was large enough to be a nuisance due to the amount of manure, and thus odor, it caused; plaintiff's was not.<sup>69</sup> As demonstrated in *Obert's Legacy Dairy*, most serious nuisance lawsuits are filed against large and very large CAFOs,<sup>70</sup> and most commonly complaining of the odors they generate.<sup>71</sup> The odors from hog CAFOs are particularly strong—studies have decomposed hog

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operations, and many persons may be discouraged from making investments in farm improvements. It is the purpose of this section to reduce the loss to the state of its agricultural resources by limiting the circumstances under which agricultural operations may be deemed to be a nuisance.”); N.C. GEN. STAT. § 106-700 (2015) (with nearly identical language).

<sup>68</sup> 988 N.E.2d 319, 320–21 (Ind. Ct. App. 2013). The court granted summary judgment for the larger dairy farm, finding that Indiana's right-to-farm law “insulate[d] the Obert's expansion of their dairy farm from nuisance suits under these circumstances.” *Id.* at 325. For further discussion about the impact of the *Obert's Legacy Dairy* case, see *infra* notes 80–82 and accompanying text.

<sup>69</sup> *Id.* at 320.

<sup>70</sup> See, e.g., Initial Case Management Order, *In re NC Swine Farm Nuisance Litig.*, No. 5:15-CV-13-BR (E.D.N.C. Jan. 9, 2015). Murphy-Brown LLC, the defendant in this mass litigation, is a hog producer for Smithfield Foods. *Welcome to Smithfield's Hog Production Division*, MURPHY BROWN LLC, <http://www.murphybrownllc.com/> (last visited Oct. 25, 2015).

<sup>71</sup> E.g., *Shatto v. McNulty*, 509 N.E.2d 897, 900 (Ind. Ct. App. 1987) (“We must observe that pork production generates odors which cannot be prevented, and so long as the human race consumes pork, someone must tolerate the smell.”); *Weinhold v. Wolff*, 555 N.W.2d 454, 459 (Iowa 1996) (odor preventing neighbors from sleeping); *Flansburgh v. Coffey*, 370 N.W.2d 127, 130 (Neb. 1985) (odor causing watering eyes and breathing problems); JULIAN CONRAD JUERGENSMEYER & THOMAS E. ROBERTS, *LAND USE PLANNING AND DEVELOPMENT REGULATION LAW* § 13:3 (3d ed. 2013); Harrison M. Pittman, *Validity, Construction, and Application of Right-to-Farm Acts*, 8 A.L.R. 6th 465 (2005); J. Patrick Wheeler, *Livestock Odor & Nuisance Actions vs. “Right-to-Farm” Laws: Report by Defendant Farmer's Attorney*, 68 N.D. L. REV. 459, 460–63 (1992) (summarizing a wide variety of cases of nuisance lawsuits involving odors from hog farms); Tomislav Vukina et al., *Swine Odor Nuisance: Voluntary Negotiation, Litigation, and Regulation: North Carolina's Experience*, 11 CHOICES, First Quarter 1996, at 26 (“The strongest public opposition has focused on offensive odors released from hog barns and manure-collecting lagoons of these large hog operations.”).



manure odors into over three hundred discrete compounds; a handful of them are harmful to human health, and some score very high on subjective assessments of odor strength.<sup>72</sup> Even in milder cases where odors may not cause health problems, they can still inhibit outdoor activity.<sup>73</sup> RTF laws wield their greatest significance when they protect these large-scale farms from nuisance suits, but they do not play a significant role in protecting the vast majority of the smaller-scale farms,<sup>74</sup> which emit noxious odors in much smaller doses.

*Should* large or very large CAFOs enjoy an absolute coming to the nuisance defense? Lockean concepts of property ownership, vesting property rights in those that have mixed their labor with the land,<sup>75</sup> lend an appeal to the defense of farmers in particular. And a first-in-time, first-in-right rule<sup>76</sup> offers simplicity and predictability. But a coming to the nuisance defense is a form of grandfathering, a differentiation of right on the basis of priority. Allocating a property priority to first settlers is to choose a particular point in time—the establishment of a CAFO—as the time for a baseline condition. But that is an arbitrary choice. There is no reason to allow noxious land uses to continue just because they were there first. The first land use, which in some cases began hundreds of years ago, says little about the best *current* land use.

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<sup>72</sup> Susan S. Schiffman et al., *Quantification of Odors and Odorants from Swine Operations in North Carolina*, 108 AGRIC. & FOREST METEOROLOGY 213, 236–38 (2001).

<sup>73</sup> *Flansburgh*, 370 N.W.2d at 130 (“They can no longer have backyard cookouts, and their grandchildren cannot play outside.”); see also K.M. Thu, *Public Health Concerns for Neighbors of Large-Scale Swine Production Operations*, 8 J. AGRIC. SAFETY & HEALTH 175, 178 (2002).

<sup>74</sup> See generally, e.g., MIGUEL A. ALTIERI, THIRD WORLD NETWORK, ENV’T & DEV. SERIES 7, SMALL FARMS AS A PLANETARY ECOLOGICAL ASSET: FIVE KEY REASONS WHY WE SHOULD SUPPORT THE REVITALIZATION OF SMALL FARMS IN THE GLOBAL SOUTH 7 (2008), <http://twm.my/title/end/pdf/end07.pdf>; Gerard D’Souza & John Ikerd, *Small Farms and Sustainable Development: Is Small More Sustainable?*, 28 J. AGRIC. & APPLIED ECON. 73, 73–78 (1996).

<sup>75</sup> Leigh Raymond & Sally K. Fairfax, *The “Shift to Privatization” in Land Conservation: A Cautionary Essay*, 42 NAT. RESOURCES J. 599, 606 (2002) (“Property arises, in Locke’s familiar allegory, through labor: someone removes something from the state of nature, making it her property, by mixing her sweat with it.”); see also Anne C. Dowling, Note, “Un-Locke-ing” a “Just Right” Environmental Regime: Overcoming the Three Bears of International Environmentalism – Sovereignty, Locke, and Compensation, WM. & MARY ENVTL. L. & POL’Y REV. 891, 912–18 (2002) (providing background on Lockean property rights theories).

<sup>76</sup> See generally JESSE DUKEMINIER ET AL., PROPERTY 11–13 (6th ed. 2006) (explaining the history and application of the first in time principle).

This line of argument has particular relevance in critically considering RTF laws. The prevailing evidence suggests that CAFOs cause significant devaluation of neighboring residential properties.<sup>77</sup> Not only does the ubiquitous odor of hog CAFOs cause houses for sale to show poorly every single day of the year, but air pollutants pose significant health risks for neighboring residents.<sup>78</sup> And, if CAFOs and residential property are mutually exclusive land uses, there is no reason to begin with the presumption that CAFOs are the more valuable use.

Finally, it is worth noting that some RTF laws do not stop at protecting existing CAFOs. *Parker v. Obert's Legacy Dairy* upheld a fairly long-standing interpretation of Indiana's RTF law as protecting not only existing farms, but also farms that *expand* operations.<sup>79</sup> As long as a farm's operational changes are not "fundamental" or "significant," RTF laws preserve its grandfathered status.<sup>80</sup> The defendant Obert's Legacy Dairy expanded from about a hundred cows to over seven hundred<sup>81</sup> (not a large CAFO by today's standards but a dramatic upsizing). The court held that such an increase was not a "significant change" in the type of agricultural operation, and could therefore not be the subject of a nuisance lawsuit brought by neighbors.<sup>82</sup> Apparently, the Indiana RTF law not only grandfathers in every farm, but grants it license to expand without limit, so long as

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<sup>77</sup> Joseph A. Herriges et al., *Living With Hogs in Iowa: The Impact of Livestock Facilities on Rural Residential Property Values*, 81 LAND ECON. 530 (2005); Jungik Kim et al., *Economic Impact and Public Costs of Confined Animal Feeding Operations at the Parcel Level of Craven County, North Carolina*, 27 AGRIC. HUM. VALUES 29, 39–41 (2010); Katherine Milla et al., *Evaluating the Effect of Proximity to Hog Farms on Residential Property Values: A GIS-Based Hedonic Price Model Approach*, 17 URB. & REGIONAL INFO. SYS. ASS'N J. 27, 30–31 (2005); Raymond B. Palmquist et al., *Hog Operations, Environmental Effects, and Residential Property Values*, 73 LAND ECON. 114 tbl.3 (1997); Isaac Bayoh et al., *The Value of Clean Dairy Air: Accounting for Endogeneity and Spatially Correlated Errors in a Hedonic Analyses of the Impact of Animal Operations on Local Property Values* 18–20 (Am. Agric. Econ. Ass'n Annual Meeting, Denver Colo., Selected Paper, 2004), <http://ageconsearch.umn.edu/bitstream/20364/1/sp04ba04.pdf>.

<sup>78</sup> See *infra* Part II.C.

<sup>79</sup> 988 N.E.2d 319, 325 (Ind. Ct. App. 2013).

<sup>80</sup> E.g., *Dalzell v. Country View Family Farms*, 517 F. App'x 518, 519 (7th Cir. 2013); *Obert's Legacy Dairy*, 988 N.E.2d at 324–25; *Lindsey v. DeGroot*, 898 N.E.2d 1251, 1257 (Ind. Ct. App. 2009); *Laux v. Chopin Land Assocs., Inc.*, 550 N.E.2d 100, 103 (Ind. Ct. App. 1990); *Shatto v. McNulty*, 509 N.E.2d 897, 900 (Ind. Ct. App. 1987).

<sup>81</sup> *Obert's Legacy Dairy*, 988 N.E.2d at 321.

<sup>82</sup> *Id.* at 324.

it does not dramatically change the “type” of operations.<sup>83</sup> Though, if expanding from one hundred to over seven hundred animals is not a significant change, then one is hard-pressed to imagine what is.

RTF laws do not actually protect farms. Despite the label, RTF laws are an implicit subsidy for large CAFOs and, as such, are an assault on small farms. In creating a legal right to farm, state legislatures have unwittingly helped create economic conditions that have made it impossible for small farmers to exercise that right.

### *B. Failure to Regulate CAFOs Under the Clean Water Act*

Traditional, small-scale hog production applies the hog manure to adjacent crops, saving on the need for synthetic, commercial fertilizers.<sup>84</sup> Large CAFOs, on the other hand, produce more manure than can be applied to adjacent crops, so manure is stored in tanks or lagoons for future application on nearby land—or so it is hoped.<sup>85</sup> Poor manure handling and storage practices generate excess runoff and pollute surface waters.<sup>86</sup> Unless manure is treated or moved off-site, available cropland and pasture can only accept a fraction of the amount of manure that is produced before excess nitrogen and phosphorus “loading” occurs, which degrades water quality.<sup>87</sup> The seepage and runoff from manure lagoons cause water bodies to experience algal blooms. In turn, algal blooms can create a variety of other ecological problems, including further oxygen depletion, prevention of photosynthesis through blocked sunlight, and the emission of toxins such as *Pfisteria* and fecal pathogens, such as *Giardia* and *Cryptosporidium*.<sup>88</sup> These toxins and fecal pathogens can either kill fish and wildlife, or render them unfit for consumption.<sup>89</sup> Nitrogen is also released indirectly into water bodies by the air

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<sup>83</sup> *Id.*

<sup>84</sup> JOHN A. LORY & RAY MASSEY, U.S. ENVTL. PROT. AGENCY, USING MANURE AS A FERTILIZER FOR CROP PRODUCTION 3–4 (2006), [http://water.epa.gov/type/watersheds/named/msbasin/upload/2006\\_8\\_25\\_msbasin\\_symposia\\_ia\\_session8.pdf](http://water.epa.gov/type/watersheds/named/msbasin/upload/2006_8_25_msbasin_symposia_ia_session8.pdf); RIBAUDO ET AL., *supra* note 59, at 16–20.

<sup>85</sup> RIBAUDO ET AL., *supra* note 59, at 5–6.

<sup>86</sup> *Id.* at 5–8.

<sup>87</sup> CARRIE HRIBAR, NAT’L ASS’N OF LOCAL BDS. OF HEALTH, UNDERSTANDING CONCENTRATED ANIMAL FEEDING OPERATIONS AND THEIR IMPACT ON COMMUNITIES 4–5 (Mark Schultz ed., 2010), [http://www.cdc.gov/nceh/ehs/docs/understanding\\_cafos\\_nalboh.pdf](http://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf).

<sup>88</sup> *Id.*

<sup>89</sup> *Id.*; see also NAT’L RESEARCH COUNCIL, CLEAN COASTAL WATERS: UNDERSTANDING AND REDUCING THE EFFECTS OF NUTRIENT POLLUTION 14–16 (2000); RIBAUDO ET AL., *supra* note 59, at 5–8.

emissions of ammonia, which is redeposited onto land and water.<sup>90</sup> The U.S. Environmental Protection Agency (EPA) estimated in 2003 that 5% of all CAFOs produced 50% of regularly farmed animals (cows, hogs, and chickens)<sup>91</sup> and 65% of excess nutrient runoff.<sup>92</sup>

Large CAFOs commonly store manure in pits directly beneath the slatted floors of a hog barn, where they will remain until it is pumped out to be spread onto crops at the right time.<sup>93</sup> However, the manure may remain in the storage pit for as long as one year, during which time it is emitting odors, harmful air pollutants, and the powerful greenhouse gas methane.<sup>94</sup> More commonly, and even more environmentally offensive, is the practice of simply storing hog manure in an open-air surface lagoon, where it runs off into waterways during rains.<sup>95</sup> Heavy rain events create large spills of hog manure into waterways, killing thousands of fish and shellfish at a time, and possibly necessitating the closure of local fisheries for weeks or months.<sup>96</sup> There is also the strong suggestion that the application of hog manure on crops has polluted groundwater supplies.<sup>97</sup>

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<sup>90</sup> John T. Walker et al., *Atmospheric Transport and Wet Deposition of Ammonium in North Carolina*, 34 ATMOSPHERIC ENV'T. 3407, 3407–08 (2000).

<sup>91</sup> National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. 2960, 2986 (proposed Jan. 12, 2001) (to be codified at 40 C.F.R. pts. 122, 412).

<sup>92</sup> RIBAUDO ET AL., *supra* note 59, at 63.

<sup>93</sup> *Anaerobic Digestion on Swine Operations*, U.S. ENVTL. PROT. AGENCY, <http://www.epa.gov/agstar/anaerobic/swine.html> (last updated Dec. 18, 2014).

<sup>94</sup> *Id.*

<sup>95</sup> *Id.*

<sup>96</sup> Michael A. Mallin et al., *Comparative Effects of Poultry and Swine Waste Lagoon Spills on the Quality of Receiving Streamwaters*, 26 J. ENVTL. QUALITY 1622, 1622 (1997); Michael A. Mallin, *Impacts of Industrial Animal Production on Rivers and Estuaries*, 88 AM. SCIENTIST 26, 26 (2000).

<sup>97</sup> MARK F. BECKER ET AL., OKLA. DEP'T OF AGRIC., FOOD, & FORESTRY, WATER-RES. INVESTIGATIONS REPORT NO. 02-4257, POSSIBLE SOURCES OF NITRATE IN GROUND WATER AT SWINE LICENSED-MANAGED FEEDING OPERATIONS IN OKLAHOMA, 2001 17–22 (2002), <http://pubs.usgs.gov/wri/wri024257/>; Angela L. Batt et al., *Occurrence of Sulfonamide Antimicrobials in Private Water Wells in Washington County, Idaho, USA*, 64 CHEMOSPHERE 1963, 1963 (2006), <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1017&context=watercenterpubs>; R.L. Huffman & P.W. Westerman, *Estimated Seepage Losses from Established Swine Waste Lagoons in the Lower Coastal Plain of North Carolina*, 38 TRANSACTIONS AM. SOC'Y AGRIC. ENGINEERS 449, 449 (1995); C. Volland et al., *Cost of Remediation of Nitrogen-Contaminated Soils Under CAFO Impoundments*, 4 J. HAZARDOUS SUBSTANCE RES. 3-1, 3-2 (2003).

Under hog contract arrangements, it is usually the contract growers—and not the conglomerates—that are responsible for manure management and disposing of it properly.<sup>98</sup> Conglomerates have used their market power over contract growers to devolve themselves of the major pollution control expense.<sup>99</sup> Individual contract growers often do not have sufficient margins to adequately treat pollution.<sup>100</sup> Contract growers, lacking deep pockets, are also more sympathetic regulatory targets,<sup>101</sup> and are thus used by the conglomerates as de facto human shields in the regulatory war they wage with environmental regulators.

For all the trouble it causes, the cost of controlling water pollution created by hog manure is not very high. The cost of large CAFOs to comply with EPA standards for manure lagoons and sprayfield systems, which collect hog manure and spray it onto a field using a sprinkler system, is about \$3.72 per finished hog,<sup>102</sup> which translates into 1.6¢ per pound of pork produced from a two hundred and fifty pound hog. Additional techniques, such as construction of a wetland with specialized plants and soil to act as a filter, cost virtually nothing.<sup>103</sup> But in an industry with tight margins, even small costs are at least perceived to be an existential threat to business.

The mass production of hog manure also introduces an opportunity to profit, an opportunity which has been largely spurned by hog farmers. “Anaerobic digesters” sequester hog manure—not only capturing odors and air pollutants, but producing methane, which can be used to generate electricity.<sup>104</sup> This creates a dual benefit:

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<sup>98</sup> PEW, *supra* note 6, at 6; Christensen Farms & Feedlots, Inc., *supra* note 32, at cl. 4.G.

<sup>99</sup> KATHRYN COCHRAN ET AL., ENVTL. DEF., DOLLARS AND SENSE: AN ECONOMIC ANALYSIS OF ALTERNATIVE HOG WASTE MANAGEMENT TECHNOLOGIES 15–18 (2000).

<sup>100</sup> PEW, *supra* note 6, at 6; Susan M. Brehm, Comment, *From Red Barn to Facility: Changing Environmental Liability to Fit the Changing Structure of Livestock Production*, 93 CAL. L. REV. 797, 799 (2005).

<sup>101</sup> Philippe Bontems et al., *Environmental Regulation of Livestock Production Contracts*, in FRONTIERS IN THE ECONOMICS OF ENVIRONMENTAL REGULATION AND LIABILITY 265, 265 (Marcel Boyer et al. eds., 2006).

<sup>102</sup> COCHRAN ET AL., *supra* note 99, at 19; *see also* N.C. State Univ., Dep’t of Agric. & Res. Econ., Technology Report: Anaerobic Lagoon and Sprayfield: Cost and Returns Analysis of Manure Management Systems Evaluated in 2004 Under the North Carolina Attorney General Agreements with Smithfield Foods, Premium Standard Farms, and Front Line Farmers 3–4 (July 2005) (unpublished report), [http://www.cals.ncsu.edu/waste\\_mgt/smithfield\\_projects/phase2report05/cd/web%20files/B1b.pdf](http://www.cals.ncsu.edu/waste_mgt/smithfield_projects/phase2report05/cd/web%20files/B1b.pdf).

<sup>103</sup> COCHRAN ET AL., *supra* note 99, at 19–20.

<sup>104</sup> ANDREW E. DESSLER, INTRODUCTION TO MODERN CLIMATE CHANGE 77–79 (2012) (Methane is a greenhouse gas that contributes to global warming, that is

sequestering a powerful greenhouse gas and creating an energy source. Anaerobic digesters<sup>105</sup> pump hog manure into a zero-oxygen container (hence the term anaerobic), in which bacterial decomposition converts the manure and emitted gases into a solid organic waste and a gaseous mixture that includes methane.<sup>106</sup> The resulting solid waste is a fertilizer, but is much less volatile and thus less polluting than the unprocessed hog manure, and the resulting gas can be combusted to generate electricity.<sup>107</sup> Eliminated during the process are the byproducts of the odor that have spawned so many nuisance lawsuits,<sup>108</sup> the air pollutants that are harmful to human health,<sup>109</sup> the nutrients that pollute waterways,<sup>110</sup> and the emission of a greenhouse gas. Instead, there is a benefit from the process: a source of energy.

It is hard to overstate how colossal of a market failure it is for CAFOs to create as much pollution as they do. Ten million hogs in the North Carolina coastal plain generate more excrement than the populations of New York City, Los Angeles, and Chicago combined.<sup>111</sup> Hundreds of millions of dollars are spent in wastewater treatment in these three cities,<sup>112</sup> yet the same cannot be said about

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approximately twenty times as powerful as carbon dioxide in trapping heat.); PETER CIBOROWSKI, MINN. POLLUTION CONTROL AGENCY, ANAEROBIC DIGESTION OF LIVESTOCK MANURE FOR POLLUTION CONTROL AND ENERGY PRODUCTION: A FEASIBILITY ASSESSMENT 14 (2001), <http://www.pca.state.mn.us/index.php/view-document.html?gid=9244>; COCHRAN ET AL., *supra* note 99, at 20; S.M. Tauseef et al., *Methane Capture from Livestock Manure*, 117 J. ENVTL. MGMT. 187, 187 (2013) (“Manure-based methane has been estimated to contribute 4% of all anthropogenic methane that is presently being added up to other natural and anthropogenic sources of global warming.”).

<sup>105</sup> CIBOROWSKI, *supra* note 104, at 14.

<sup>106</sup> COCHRAN ET AL., *supra* note 99, at 22.

<sup>107</sup> CIBOROWSKI, *supra* note 104, at 18.

<sup>108</sup> Wheeler, *supra* note 71.

<sup>109</sup> See *infra* Part II.C.

<sup>110</sup> See, e.g., Catherine M.H. Keske, *Anaerobic Digestion Technology: How Agricultural Producers and the Environment Might Profit from Nuisance Lawsuits*, 52 NAT. RESOURCES J. 315, 317 (2012).

<sup>111</sup> COCHRAN ET AL., *supra* note 99, at 7.

<sup>112</sup> See GRACE ROBINSON CHAN, SANITATION DISTRICTS OF LOS ANGELES COUNTY CALIFORNIA, COMPREHENSIVE ANNUAL FINANCIAL REPORT sched. 12 (2013), <http://www.lacsd.org/civica/filebank/blobdload.asp?BlobID=9018>; CITY OF CHI., COMPREHENSIVE ANNUAL FINANCIAL REPORT OF THE METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO 19 (2013), [https://www.mwrd.org/pv\\_obj\\_cache/pv\\_obj\\_id\\_DBDBB10BBAEC275AC88E7A8C524031FAC0F02000/filename/CAFR2013.pdf](https://www.mwrd.org/pv_obj_cache/pv_obj_id_DBDBB10BBAEC275AC88E7A8C524031FAC0F02000/filename/CAFR2013.pdf); CITY OF N.Y.C., NEW YORK CITY WATER & SEWER SYSTEM 2014: A COMPREHENSIVE ANNUAL FINANCIAL REPORT FOR THE FISCAL YEARS ENDED JUNE 30,

CAFOs. In the long run, modest pollution control costs spent by CAFOs could generate enormous savings in avoided water treatment and provide countless environmental and ecological benefits. To say this is low-hanging fruit is a gross understatement.

And yet regulation of the water pollution emanating from CAFOs was a long-delayed and still contested process. The EPA is charged with limiting discharges of pollution into “waters of the United States” under the National Pollution Discharge Elimination System (NPDES)<sup>113</sup> in the Clean Water Act.<sup>114</sup> The EPA’s mandate under the NPDES program was clear enough with respect to CAFOs. The original passage of the Clean Water Act in 1972<sup>115</sup> included the specific words “concentrated animal feeding operations” in the definition of “point source”<sup>116</sup> to indicate that Congress intended for the EPA to regulate CAFOs as it regulates industrial sources of pollution: by issuing appropriate “effluent limitations.” In 2001, nine years after a consent decree required the EPA to develop NPDES permitting regulations for CAFOs,<sup>117</sup> the EPA proposed a rule that would require, for the first time, CAFOs to obtain an NPDES permit.<sup>118</sup> Two more years of controversy produced a final rule in 2003.<sup>119</sup> However, this rule was challenged by environmental organizations on the grounds that it did not require that actual nutrient management plans be part of NPDES permit applications. Since the term “effluent limitation” is defined as a limit on “quantities, rates, and concentrations of chemical, physical, biological, and other constituents” discharged,<sup>120</sup> an NPDES permit without even a statement of *how* CAFOs intended to limit the amount of nutrients escaping into waterways—never mind an actual limit on quantities, rates, or concentrations—was not an “effluent limitation” at all.

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2014 AND 2013 3 (2014), [http://www.nyc.gov/html/nycwaterboard/pdf/statements\\_and\\_reports/wb\\_annual\\_report\\_14.pdf](http://www.nyc.gov/html/nycwaterboard/pdf/statements_and_reports/wb_annual_report_14.pdf).

<sup>113</sup> Clean Water Act, 33 U.S.C. § 1342 (2012).

<sup>114</sup> *Id.* at §§ 1251–1387.

<sup>115</sup> Pub. L. No. 92-500 § 502(14), 86 Stat. 816, 887 (1972).

<sup>116</sup> *Id.*

<sup>117</sup> National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations (CAFOs), 68 Fed. Reg. 7176, 7186 (Feb. 12, 2003) (to be codified at 21 C.F.R. pts. 9, 122, 123, 412).

<sup>118</sup> *Id.*

<sup>119</sup> *Id.*

<sup>120</sup> *Waterkeeper All., Inc., v. U.S. Env'tl. Prot. Agency*, 399 F.3d 486, 502 (2d Cir. 2005) (quoting 33 U.S.C. § 1362(11)).

It is certainly true that regulating the water pollution resulting from the inappropriate handling of hog manure is a much less exact science than even the inexact sciences of regulating industrial discharges from an outflow pipe. By its nature, farm pollution is more diffuse, and its inputs—livestock manure, pesticides, eroding soil—are less susceptible of quantification. Farm pollution is thus less susceptible to quantity, rate, or concentration regulation. Therefore, it is understandable that the EPA might want to tackle other regulatory challenges first. But the protracted and litigation-driven nature of the process suggests that the EPA never, as a political matter, wished to impose any burdens on farmers. For the EPA to make its first proposed rule in 2001, almost thirty years after Congress instructed the EPA to regulate CAFO discharges, is a bit ridiculous. It could well have been longer if it were not for a lawsuit by an environmental organization.<sup>121</sup> Not only that, but the 2001 rule was so weak that another lawsuit filed by another environmental organization<sup>122</sup> finally forced the EPA, after another six years, to finally develop a final rule:<sup>123</sup> a total of thirty-six years after Congress gave the EPA its explicit marching orders.<sup>124</sup>

Why has the EPA been so reluctant to regulate CAFOs when Congress spoke so clearly? This Article is not a descriptive account of the politics of agricultural law or policy. That is well-trod ground better left to political scientists and political economists.<sup>125</sup> Rather,

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<sup>121</sup> Nat. Res. Def. Council v. Reilly, 983 F.2d 259 (D.C. Cir. 1993).

<sup>122</sup> *Waterkeeper All., Inc.*, 399 F.3d at 502.

<sup>123</sup> Revised National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines for Concentrated Animal Feeding Operations in Response to the Waterkeeper Decision, 73 Fed. Reg. 70,418, 70,418 (Nov. 20, 2008) (to be codified at 40 C.F.R. pts. 9, 122, 412).

<sup>124</sup> In 2008, the EPA's final rule was challenged by the National Pork Producers Council, Nat'l Pork Producers Council v. U.S. Env'tl. Prot. Agency, 635 F.3d 738 (5th Cir. 2011), and resulted in another change to the 2008 rule. The rule exempted CAFOs that were only proposing to discharge water pollutants. National Pollutant Discharge Elimination System (NPDES) Concentrated Animal Feeding Operation (CAFO) Reporting Rule, 76 Fed. Reg. 65,431, 65,435 (Oct. 21, 2011) (to be codified at 40 C.F.R. pts. 9, 122).

<sup>125</sup> See, e.g., David Freshwater, *An Interview with Lee Hamilton*, 9 CHOICES, Fourth Quarter 1994, at 34 (“[E]ven though farmers are a very small percentage of the population, and one that is getting smaller every year, they retain political clout that far exceeds their numbers.”); Robert Paarlberg, *The Political Economy of American Agricultural Policy: Three Approaches*, 71 AM. J. AGRIC. ECON. 1157, 1157 (1989) (“U.S. policy is said to protect agriculture because of something distinctive in our nation's ideology, a Jeffersonian belief in the unique virtue of small yeomen farmers.”); Rausser, *supra* note 2, at 134 (discussing inefficient “predatory” government policy as opposed to efficient “productive” agricultural practices).



this Article is a description of the extent to which law and policy have been bent to the will of certain agricultural interests. It has not been the will of the majority of farmers, the vast majority of which have small farms. It has been the will of large farmers who would actually have to suffer the costs of compliance. A USDA study found that only 46% of small farms (defined as less than 300 animal units, or 750 hogs weighing more than fifty-five pounds)<sup>126</sup> would comply with the EPA's 2003 proposed regulations for nitrogen discharges.<sup>127</sup> However, only 18% of large farms (defined as more than 2500 hogs of at least fifty-five pounds)<sup>128</sup> would meet the same standard.<sup>129</sup> Similarly skewed numbers existed for the EPA phosphorous standard: 69% of small farms versus 20% of large farms.<sup>130</sup> The net costs of properly disposing of hog manure—paying crop farmers to accept it as fertilizer—depends on how much excess manure is generated and also whether there are nearby crop farmers that can use it without creating nutrient overloading problems of their own. Large farms will generally pay significantly higher costs for disposal on a per-unit basis, if one subtracts out the one-time plan development costs that are required.<sup>131</sup> Given these cost dynamics, it seems clear that large farms have had the most to lose from the EPA regulation of water pollution from hog farming.

### *C. Failure to Regulate Air Emissions from CAFOs*

Pollution from hog manure is not limited to runoff. Much less appreciated, but still quite costly, are the *air* emissions from hog manure. Volatilized ammonia, the gaseous form of nitrogen emanating from hog excrement, pollutes in two ways: (1) by deposition onto land or water, reaching land and waterbodies beyond a spill range, and (2) while airborne, acting as a source of air pollution.

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<sup>126</sup> RIBAUDO, ET AL., *supra* note 59, at 14.

<sup>127</sup> National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations (CAFOs), 68 Fed. Reg. 7176, 7186 (Feb. 12, 2003).

<sup>128</sup> RIBAUDO ET AL., *supra* note 59, at 14.

<sup>129</sup> *Id.* at 17 tbl.3-1.

<sup>130</sup> *Id.*

<sup>131</sup> *Id.* at 18–25. Plan development costs are high for small farms that do not already have them (and who would fail to meet the standard). The net disposal costs are actually *higher* for small farms than large farms. *Id.* at 20.

Ammonia emitted from hog manure and deposited onto land or water will assume the form of ammonia ions, which acidify soils and receiving waterbodies.<sup>132</sup> An estimated 430,000 tons of ammonia were emitted in 2002,<sup>133</sup> enough to make over thirty-seven billion 32-ounce bottles of Windex.<sup>134</sup> Deposit after emission tends to occur relatively locally, within thirty miles of the emitting CAFO.<sup>135</sup> In addition to presenting ecological threats through land or water deposition, ammonia also presents a public health threat. Airborne ammonia is a fine particulate matter, which causes respiratory problems ranging from irritation and asthma to premature death,<sup>136</sup> and ammonia is estimated to be about half of all fine particulate matter emitted in the eastern United States.<sup>137</sup>

CAFOs also emit hydrogen sulfide,<sup>138</sup> which causes health effects ranging from temporary to long-term moodiness and depression<sup>139</sup> and, in more serious cases, severe debilitation and even the occasional death.<sup>140</sup> The most prevalent health effects of emissions are non-

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<sup>132</sup> Sagar V. Krupa, *Effects of Atmospheric Ammonia (NH<sub>3</sub>) on Terrestrial Vegetation: A Review*, 124 ENVTL. POLLUTION 179, 205 (2003).

<sup>133</sup> U.S. ENVTL. PROT. AGENCY, NATIONAL EMISSION INVENTORY—AMMONIA EMISSIONS FROM ANIMAL HUSBANDRY 4 (2004), [http://www.epa.gov/ttn/chief/ap42/ch09/related/nh3inventoryfactsheet\\_jan2004.pdf](http://www.epa.gov/ttn/chief/ap42/ch09/related/nh3inventoryfactsheet_jan2004.pdf).

<sup>134</sup> MATERIAL SAFETY AND DATA SHEET: WINDEX POWERIZED GLASS CLEANER (RTU), DIVERSEY (2012), [http://www.foothill.edu/printmaking/msds/windex\\_msds.pdf](http://www.foothill.edu/printmaking/msds/windex_msds.pdf) (indicates that it is 0.1% to 1.5% ammonia by weight); AMAZON, <http://www.amazon.com> (search “Windex 32oz”) (shipping weight of a 32-ounce glass is 2.3 pounds) (search conducted March 3, 2015, printout on file with author).

<sup>135</sup> GURIAN-SHERMAN, *supra* note 49, at 54.

<sup>136</sup> Donald R. McCubbin et al., *Livestock Ammonia Management and Particulate-Related Health Benefits*, 36 ENVTL. SCI. & TECH. 1141, 1141 (2002); *Particulate Matter (PM)*, U.S. ENVTL. PROT. AGENCY, <http://www.epa.gov/pm/> (last updated Sept. 10, 2015). Fine particulate matter is defined as airborne solids less than 2.5 microns in diameter. *Id.*

<sup>137</sup> Natalie Anderson et al., *Airborne Reduced Nitrogen: Ammonia Emissions from Agriculture and Other Sources*, 29 ENVMT. INT’L 277, 277 (2003).

<sup>138</sup> GURIAN-SHERMAN, *supra* note 49, at 55.

<sup>139</sup> Kaye H. Kilburn, *Exposure to Reduced Sulfur Gases Impairs Neurobehavioral Function*, 90 S. MED. J. 997, 997 (1997); Susan S. Schiffman et al., *Symptomatic Effects of Exposure to Diluted Air Sampled from a Swine Confinement Atmosphere on Healthy Human Subjects*, 113 ENVTL. HEALTH PERSP. 567, 567 (2005).

<sup>140</sup> Kelley J. Donham et al., *Acute Toxic Exposure to Gases from Liquid Manure*, 24 J. OCCUPATIONAL MED. 142, 144 (1982); Kelley Donham et al., *Environmental and Health Studies of Farm Workers in Swedish Swine Confinement Buildings*, 46 BRITISH J. INDUS. MED. 31, 32 (1989); Kelley J. Donham, *Health Effects from Work in Swine Confinement Buildings*, 17 AM. J. INDUS. MED. 17, 18 (1990); Kelley J. Donham et al., *Production Rates of Toxic Gases from Liquid Swine Manure: Health Implications for Workers and Animals in Swine Confinement Buildings*, 24 BIOLOGICAL WASTES 161, 163 (1988); Lida

lethal, but still costly. A number of studies have shown that CAFO emissions lead to significant increases in cases of asthma and nasal allergies.<sup>141</sup> Effects are more acute among adolescents attending school near large hog CAFOs, who suffer a higher incidence of asthma,<sup>142</sup> and more acute still for children living on hog farms.<sup>143</sup>

Like water pollution regulation under the Clean Water Act, air pollution regulation under the Clean Air Act would be challenging from an administrative perspective. Unlike the Clean Water Act, the Clean Air Act contains no explicit inclusion of CAFOs into a regulatory definition like “point source,”<sup>144</sup> so the EPA could more defensibly avoid the task. The EPA rule for water pollution from CAFOs is a general permit, which applies broadly to a *class of dischargers*, thereby avoiding the need to issue each of the sixty thousand hog farms individually.<sup>145</sup> No such mechanism exists under the Clean Air Act. Regulating each CAFO as a “source” of pollution, much like one would regulate a fossil-fueled power plant or a refinery, would be an enormous headache for the EPA.

Indisputably, however, emissions pose public health threats. Just as the EPA can target its water pollution regulatory efforts towards the largest hog CAFOs, it can target its air emissions regulation in large part toward the same hog CAFOs. After all, the source of the water pollution and air pollution is the same: the manure.

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N. Osborn & Robert O. Crapo, *Dung Lung: A Report of Toxic Exposure to Liquid Manure*, 95 ANNALS INTERNAL MED. 312, 314 (1981).

<sup>141</sup> Frank M. Mitloehner & Marc B. Schenker, Commentary, *Environmental Exposure and Health Effects from Concentrated Animal Feeding Operations*, 18 EPIDEMIOLOGY 309, 310 (2007); Katja Radon et al., *Environmental Exposure to Confined Animal Feeding Operations and Respiratory Health of Neighboring Residents*, 18 EPIDEMIOLOGY 300, 306–07 (2007).

<sup>142</sup> Maria C. Mirabelli et al., *Asthma Symptoms Among Adolescents Who Attend Public Schools That Are Located Near Confined Swine Feeding Operations*, 118 PEDIATRICS e66, e70–e73 (2006); Maria C. Mirabelli et al., *Race, Poverty, and Potential Exposure of Middle-School Students to Air Emissions from Confined Swine Feeding Operations*, 114 ENVTL. HEALTH PERSP. 591, 594 (2006); Sigurdur T. Sigurdarson & Joel N. Kline, *School Proximity to Concentrated Animal Feeding Operations and Prevalence of Asthma in Students*, 129 CHEST J. 1486, 1488 (2006).

<sup>143</sup> James A. Merchant et al., *Asthma and Farm Exposures in a Cohort of Rural Iowa Children*, 113 ENVTL. HEALTH PERSP. 350, 350 (2005).

<sup>144</sup> 33 U.S.C. § 1362(14) (2012).

<sup>145</sup> See generally Jeffrey M. Gaba, *Generally Illegal: NPDES General Permits Under the Clean Water Act*, 31 HARV. ENVTL. L. REV. 409 (2007) (discussing the three classes of EPA permits in the NPDES program).

*D. Lack of Oversight of Administration of Antibiotics to Livestock*

For decades, scientists have tracked the emergence of bacteria that are resistant to antibiotics used to treat them. Between 1940 and 1996, eight major strains were discovered.<sup>146</sup> That number has doubled since then.<sup>147</sup> Every time a person or animal is administered an antibiotic—needed or not—bacteria have an opportunity to develop a resistance to that antibiotic. Those bacteria are then transmitted. One method of transmission is through the stomach of livestock administered antibiotics, which is excreted in manure, and then propagated to wherever the manure is permitted to go. The same is true of humans.<sup>148</sup> With every propagation there is an opportunity for bacteria to evolve and adapt, multiplying strains that resist the effects of antibiotics. The overuse of antibiotics in both humans and livestock has led to an alarming uptick in new antibiotic-resistant bacteria. The Centers for Disease Control and Prevention (CDC) estimate that every year, over two million Americans contract a bacterial infection that is resistant to one or more common antibiotics that have been previously used to treat the infection.<sup>149</sup> Of those, about twenty-three thousand die.<sup>150</sup>

The most damaging strain of antibiotic-resistant bacteria is Methicillin-resistant *Staphylococcus aureus*, or MRSA, which accounts for eleven thousand deaths per year.<sup>151</sup> MRSA infections seem to have a special link with the use of antibiotics in livestock, as new strains of MRSA have emerged that are uniquely endemic to hogs and hog farmers.<sup>152</sup> The link to livestock use is particularly

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<sup>146</sup> CTRS. FOR DISEASE CONTROL & PREVENTION, ANTIBIOTIC RESISTANCE THREATS IN THE UNITED STATES, 2013 28 (2013) [hereinafter CDC REPORT], <http://www.cdc.gov/drugresistance/pdf/ar-threats-2013-508.pdf>.

<sup>147</sup> *Id.*

<sup>148</sup> *Id.* at 14.

<sup>149</sup> *Id.* at 11.

<sup>150</sup> *Id.*; see also WORLD HEALTH ORG., THE EVOLVING THREAT OF ANTIMICROBIAL RESISTANCE: OPTIONS FOR ACTION 28 (2012) (estimating sixty-three thousand out-patient deaths in the United States and twenty-five thousand in-patient deaths in Europe per year).

<sup>151</sup> CDC REPORT, *supra* note 146, at 16.

<sup>152</sup> T. Khanna et al., *Methicillin Resistant Staphylococcus Aureus Colonization in Pigs and Pig Farmers*, 128 VETERINARY MICROBIOLOGY 298, 299–300 (2008); Inge van Loo et al., *Emergence of Methicillin-Resistant Staphylococcus Aureus of Animal Origin in Humans*, 13 EMERGING INFECTIOUS DISEASES 1834, 1834 (2007).

strong, as some of these new strains of MRSA have emerged solely from farm animals.<sup>153</sup>

About 80% by volume of the antibiotics administered in the United States are given to livestock.<sup>154</sup> Some CAFOs use antibiotics solely to promote animal growth, giving animals an added boost in fighting infection and freeing up bodily resources to add weight.<sup>155</sup> It is especially harmful when CAFOs mix antibiotics in with feed,<sup>156</sup> as if it were a vitamin supplement. The problem with this kind of subtherapeutic administration is that these low-level doses are high enough to affect bacteria, but not high enough to kill them all off—giving bacteria the maximum chance to adapt, become antibiotic-resistant, and multiply.<sup>157</sup>

Exactly how common this practice is and who uses them is hard to say, as until recently neither farmers nor pharmaceutical companies were required to report on their use or sale of antibiotics.<sup>158</sup> In the most authoritative study of hog farmers, USDA researchers reported that only 16% of surveyed hog farms did not use antibiotics at all.<sup>159</sup> The subtherapeutic use of antibiotics was statistically much more frequent on large farms under a production contract.<sup>160</sup> It is not as if small hog farms avoid the use of antibiotics altogether. But the nature of hog farming is such that antibiotic use is much more necessary in the context of very large-scale farming. Some contract hog farmers

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<sup>153</sup> Khanna et al., *supra* note 152, at 300 (finding that hog farmers never tested positive for a specific strain of MRSA unless the hogs also tested positive).

<sup>154</sup> See Ezekiel J. Emanuel, Opinion, *How to Develop New Antibiotics*, N.Y. TIMES, Feb. 24, 2015, at A23; David A. Kessler, Opinion, *Antibiotics and the Meat We Eat*, N.Y. TIMES, Mar. 28, 2013, at A27; Aude Teillant & Ramanan Laxminarayan, *Economics of Antibiotic Use in U.S. Swine and Poultry Production*, 30 CHOICES, First Quarter 2015, at 4.

<sup>155</sup> Nigel Key & William D. McBride, *Sub-therapeutic Antibiotics and the Efficiency of U.S. Hog Farms*, 96 AM. J. AGRIC. ECON. 831, 838 tbl.1 (2014) (showing 3.3% of feeder-to-finish farms using antibiotics for a single purpose, “growth promotion”).

<sup>156</sup> *Id.* at 840 n.13.

<sup>157</sup> G. Douglas Inglis et al., *Effects of Subtherapeutic Administration of Antimicrobial Agents to Beef Cattle on the Prevalence of Antimicrobial Resistance in Campylobacter Jejuni and Campylobacter Hyointestinalis*, 71 APPLIED ENVTL. MICROBIOLOGY 3872, 3877 (2005); Marc Lipsitch et al., *Antibiotics in Agriculture: When is it Time to Close the Barn Door?*, 99 PROC. NAT’L ACAD. SCI. 5752, 5754 (2002); Katherine M. Shea, *Nontherapeutic Use of Antimicrobial Agents in Animal Agriculture: Implications for Pediatrics*, 114 AM. ACAD. PEDIATRICS 862, 862 (2004).

<sup>158</sup> The Food and Drug Administration has only recently moved to require disclosure of antimicrobial drug sales. Antimicrobial Animal Drug Sales and Distribution Reporting, 80 Fed. Reg. 28,863, 28,863 (May 20, 2015) (to be codified at 21 C.F.R. pt. 314).

<sup>159</sup> Key & McBride, *supra* note 155, at 842 tbl.4.

<sup>160</sup> *Id.*

receive incentive payments based on feed conversion or low mortality rates.<sup>161</sup> So while livestock farming's share of the blame for the rise of antibiotic-resistant bacteria cannot be laid entirely on large hog CAFOs, the failure to regulate the administration of antibiotics to livestock fits very neatly into the game plan of large, vertically integrated livestock conglomerates.

While the epidemiological link between the use of antibiotics in livestock and the emergence of antibiotic-resistant bacteria is not concrete, the evidence is strongly suggestive: antibiotic-resistant bacteria are commonly found on-site at CAFOs, found downwind and downstream, but not found at all upwind.<sup>162</sup> Some antibiotics administered to livestock are in fact the same ones used to treat humans for life-threatening infections, and which have now lost their effectiveness.<sup>163</sup> Following a ban in the European Union on the use of antibiotics for growth promotion, levels of antibiotic-resistant bacteria decreased.<sup>164</sup> While the use of antibiotics by CAFOs cannot be completely blamed for the emergence of antibiotic-resistant bacteria and for human illness and death, there is very good reason to believe that the practice is a very significant contributing cause.<sup>165</sup>

Even if antibiotic use for livestock is only weakly linked to the emergence of antibiotic-resistant bacteria, the shame is that this use is so unnecessary. In the 2009 survey of hog farmers by USDA researchers, almost half of those responding reported that they

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<sup>161</sup> *Id.* at 848.

<sup>162</sup> Shawn G. Gibbs et al., *Airborne Antibiotic Resistant and Nonresistant Bacteria and Fungi Recovered from Two Swine Herd Confined Animal Feeding Operations*, 1 J. OCCUPATIONAL & ENVTL. HYGIENE 699, 701–03 (2004); Shawn G. Gibbs et al., *Isolation of Antibiotic-Resistant Bacteria from the Air Plume Downwind of a Swine Confined or Concentrated Animal Feeding Operation*, 114 ENVTL. HEALTH PERSP. 1032, 1036 (2006).

<sup>163</sup> PEW, *supra* note 6, at 15.

<sup>164</sup> Frank Møller Aarestrup et al., *Effect of Abolishment of the Use of Antimicrobial Agents for Growth Promotion on Occurrence of Antimicrobial Resistance in Fecal Enterococci from Food Animals in Denmark*, 45 ANTIMICROBIAL AGENTS & CHEMOTHERAPY 2054, 2057–58 (2001); H.-D. Emborg et al., *Relations Between the Occurrence of Resistance to Antimicrobial Growth Promoters Among Enterococcus faecium Isolated from Broilers and Broiler Meat*, 84 INT'L J. FOOD MICROBIOLOGY 273, 283 (2003).

<sup>165</sup> Jose Luis Martinez, *Environmental Pollution by Antibiotics and by Antibiotic Resistance Determinants*, 157 ENVTL. POLLUTION 2893, 2894 (2009); David L. Smith et al., *Animal Antibiotic Use Has an Early but Important Impact on the Emergence of Antibiotic Resistance in Human Commensal Bacteria*, 99 PROC. NAT'L ACAD. SCI. 6434, 6436–37 (2002); Michael Teuber, *Veterinary Use and Antibiotic Resistance*, 4 CURRENT OPINION MICROBIOLOGY 493, 497 (2001).

administered antibiotics at least in part for “growth promotion.”<sup>166</sup> This practice is a reckless endangerment of human health. But to put an exclamation point on the multidimensional foolishness of this practice, its contribution to productivity is paltry: the most recent study estimated a weight gain of about 1.0 to 1.3%.<sup>167</sup> Hogs are scarcely 1% fatter for this practice, a vanishingly small advantage when weighed against the harms caused by antibiotic-resistant bacteria. Indeed, the effectiveness of antibiotics in boosting hog growth is highest in the presence of poor nutrition and otherwise poor conditions for hogs, simply because there is more disease for the antibiotics to treat.<sup>168</sup> Antibiotics, as it turns out, work best as a substitute for competent management and humane treatment of animals.

Certainly the administration of antibiotics to livestock has played a very significant role in the emergence of resistant strains. If even a small fraction of those two million Americans sickened and twenty-three thousand dead every year from antibiotic-resistant bacterial infections could be attributed to hog farms, a cost-benefit analysis would reveal a vast differential between huge costs and miniscule benefits.<sup>169</sup>

Perhaps even more alarming than the emergence of antibiotic-resistant bacteria is the introduction of risk of interspecies pathogen transfer, for which hogs seem to serve as particularly helpful hosts.<sup>170</sup> The confinement of a large number of animals to a small area provides an excellent breeding ground for new viruses. Not only does the tight confinement of livestock make transmission more likely, but

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<sup>166</sup> Key & McBride, *supra* note 155, at 838 tbl.1.

<sup>167</sup> *Id.* at 839, 848; see also Gay Y. Miller et al., *Farm-Level Impacts of Banning Growth-Promoting Antibiotic Use in U.S. Pig Grower/Finisher Operations*, 23 J. AGRIBUSINESS 147, 159 tbl.6 (2005); Gay Y. Miller et al., *Productivity and Economic Effects of Antibiotics Used for Growth Promotion in U.S. Pork Production*, 35 J. AGRIC. & APPLIED ECON. 469, 471 (2003).

<sup>168</sup> VIRGIL W. HAYS, EFFECTIVENESS OF FEED ADDITIVE USAGE OF ANTIBACTERIAL AGENTS IN SWINE AND POULTRY PRODUCTION 31–40 (1970).

<sup>169</sup> CDC REPORT, *supra* note 146, at 11. The report estimates that the national cost of antibiotic-resistant bacteria may be as high as twenty billion dollars in direct health care costs and an additional thirty-five billion dollars in lost productivity. *Id.* These numbers do not include the value of statistical lives lost due to infection by antibiotic-resistant bacteria. *Id.*

<sup>170</sup> Kendall P. Myers et al., *Are Swine Workers in the United States at Increased Risk of Infection with Zoonotic Influenza Virus?*, 42 CLINICAL INFECTIOUS DISEASES 14, 14 (2006); Kendall P. Myers et al., *Cases of Swine Influenza in Humans: A Review of the Literature*, 44 CLINICAL INFECTIOUS DISEASES 1084, 1084 (2007).

it makes life stressful for animals and increases their vulnerability to disease.<sup>171</sup> Moreover, farmers and farmworkers in CAFOs routinely deal with thousands of animals daily, a stark contrast to the much less intense interactions on small farms.<sup>172</sup> The health threats to workers posed by CAFOs, combined with the higher likelihood of animal sickness in CAFOs, produces an especially heightened risk of interspecies transfer.<sup>173</sup> The evolution of zoonotic disease into forms that infect humans has always been a game of chance, but the intense concentration of animals in tight quarters and the exposure of workers to new viruses is the equivalent of millions of additional rolls of the dice.

This wanton overuse and misuse of antibiotics, and the crowded, industrialized farming it engenders, is a conscious policy choice. Banning the use of antibiotics in livestock, as hog-export power Denmark has done,<sup>174</sup> would not only eliminate whatever responsibility hog farming bears for antibiotic-resistant bacteria, but also potentially discourage the overcrowded conditions that incubate dangerous zoonotic diseases that could transfer to humans. The Food and Drug Administration (FDA) has legal authority to regulate “new animal drugs” if they are “unsafe.”<sup>175</sup> The FDA considered doing so, going so far in 1973 as to require antibiotic manufacturers to provide any test results and “[b]y April 20, 1975, data satisfying all other specified criteria for safety and effectiveness,” and threatening the firms with withdrawal of approval of the drugs.<sup>176</sup> This initiative went nowhere. It was not until 2012—thirty-seven years later—that the EPA announced a plan to work with drug makers to phase out the most dangerous practices,<sup>177</sup> a plan that was promptly struck down by

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<sup>171</sup> PEW, *supra* note 6, at 13.

<sup>172</sup> *Id.*

<sup>173</sup> Gregory C. Gray et al., *Pandemic Influenza Planning: Shouldn't Swine and Poultry Workers Be Included?*, 25 VACCINE 4376, 4377–78 (2007); Roberto A. Saenz et al., *Confined Animal Feeding Operations as Amplifiers of Influenza*, 6 VECTOR-BORNE & ZOONOTIC DISEASES 338, 344 (2006).

<sup>174</sup> Teillant & Laxminarayan, *supra* note 154, at 4.

<sup>175</sup> 21 U.S.C. § 360b(a)(1) (2012).

<sup>176</sup> New Animal Drugs, 38 Fed. Reg. 9811, 9813 (proposed Apr. 20, 1973) (to be codified at 21 C.F.R. pt. 135).

<sup>177</sup> U.S. DEP'T OF HEALTH & HUMAN SERVS., FOOD & DRUG ADMIN., GUIDANCE FOR INDUSTRY REPORT NO. 209, THE JUDICIOUS USE OF MEDICALLY IMPORTANT ANTIMICROBIAL DRUGS IN FOOD-PRODUCING ANIMALS 17–19 (2012).



a federal court as being insufficient.<sup>178</sup> On appeal the Second Circuit reversed the district court, finding that the FDA's regulation is a reasonable interpretation of the statute.<sup>179</sup> As a result, the use of antibiotics for livestock not only continues, but shows an alarming increase.<sup>180</sup>

An additional question should be asked: Even if the FDA somehow overcomes its long history of delaying regulation on the subtherapeutic use of antibiotics in livestock, is it worth allowing livestock in CAFOs to receive antibiotics *at all*? In the 2011 survey, hog farmers could have reported that, in addition to or instead of “growth promotion,” they used antibiotics for “disease treatment” and/or “disease prevention.”<sup>181</sup> It is easy to imagine that when asked, hog farmers might minimize their guilt feelings by shading their responses away from the naked “growth promotion” answer. But even if these responses were to be taken at face value, so what? Separating out these responses creates distinctions without differences. Even “disease treatment” is a use of antibiotics that would not be necessary if hogs were not raised in the crowded, confined conditions of CAFOs. CAFOs create stressful conditions and cause more illness because infectious disease is transmitted more easily than on traditional, small-scale farms.<sup>182</sup> In a sense, almost all administration of antibiotics to hogs in CAFOs is productivity enhancement. The point of administering antibiotics to hogs in large CAFOs is to take a traditional mortality that was low and squash that rate down to zero, even as the conditions for sickness intensify. That is a trivial benefit compared to the potential risks to the human population—particularly when the alternative is the raising of hogs on less-intense, small-scale farms. Again, in leaving hog farming alone, we have left hog farming to the large conglomerates.

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<sup>178</sup> *Nat. Res. Def. Council, Inc. v. U.S. Food & Drug Admin.*, 872 F. Supp. 2d 318 (S.D.N.Y. 2012), *rev'd*, 760 F.3d 151, 166 (2d Cir. 2014).

<sup>179</sup> *Nat. Res. Def. Council, Inc.*, 760 F.3d at 166.

<sup>180</sup> David Hoffman & Emma Schwartz, *Sharp Increase Seen in Sales of Antibiotics for Use in Farm Animals*, PBS FRONTLINE (Oct. 2, 2014), <http://www.pbs.org/wgbh/pages/frontline/health-science-technology/trouble-with-antibiotics/sharp-increase-seen-in-sales-of-antibiotics-for-use-in-farm-animals/>.

<sup>181</sup> Key & McBride, *supra* note 155, at 838 tbl.1.

<sup>182</sup> PEW, *supra* note 6, at 13.

*E. Failure to Prevent Market Concentration Through Trade  
Regulation*

It should not be a surprise that a problem of industrial concentration in hog farming would have a substantial antitrust component. In many ways, hog farming is no different from other industries that have consolidated in recent years, such as commercial airlines, accounting firms, law firms, or broadband providers. However, trade practices in livestock are governed by the 1921 Packers and Stockyards Act (PSA),<sup>183</sup> not the Sherman Antitrust Act (Sherman Act).<sup>184</sup> The PSA replaces, not supplements, the Sherman Act by excluding meatpacking from the terms of the Sherman Act.<sup>185</sup>

The Sherman Act jurisprudence took a sharp laissez-faire turn with *Reiter v. Sonotone Corp.*, in which the United States Supreme Court declared that the Act was intended to be a “consumer welfare prescription.”<sup>186</sup> Citing Robert Bork’s influential book, *The Antitrust Paradox*, the Court brushed aside nearly seven decades of jurisprudence and antitrust policy that was oriented towards preserving competition, rather than maximizing consumer welfare.<sup>187</sup> Under this new view, as long as consumer welfare is not reduced, almost any business practice survives Sherman Act scrutiny.<sup>188</sup> Bork’s noninterventionist view of the Sherman Act, strongly taken up by scholars at the University of Chicago,<sup>189</sup> has been vigorously contested on normative grounds,<sup>190</sup> but everyone agrees that, as a

<sup>183</sup> Packers and Stockyards Act, 1921, ch. 64, tit. I, § 1, 42 Stat. 159 (1921) (current version at 7 U.S.C. § 181 (2012)).

<sup>184</sup> 15 U.S.C. §§ 1–7 (2012).

<sup>185</sup> H.R. REP. NO. 85-1048, at 14 (1957), *reprinted in* 1957 U.S.C.C.A.N. 5213, 5222 (“To justify its removal of the meatpacking industry from these [antitrust] statutes and from the jurisdiction of the Federal Trade Commission, the Packers and Stockyards Act provided additionally a substitute regulation under the jurisdiction of the United States Department of Agriculture.”).

<sup>186</sup> 442 U.S. 330, 343 (1979) (quoting ROBERT H. BORK, *THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF* 66 (1978)).

<sup>187</sup> *Id.*

<sup>188</sup> Eleanor M. Fox, *Against Goals*, 81 *FORDHAM L. REV.* 2157, 2159 (2013) (“The operational goal . . . is to let business be free of antitrust unless its acts will decrease aggregate consumer surplus . . .”).

<sup>189</sup> David A. Hyman & William E. Kovacic, *Institutional Design, Agency Life Cycle, and the Goals of Competition Law*, 81 *FORDHAM L. REV.* 2163, 2163 (2013); Robert H. Lande, *Wealth Transfers as the Original and Primary Concern of Antitrust: The Efficiency Interpretation Challenged*, 34 *HASTINGS L.J.* 65, 73 n.32 (1982).

<sup>190</sup> Fox, *supra* note 188, at 2159; Michael S. Jacobs, Essay, *An Essay on the Normative Foundations of Antitrust Economics*, 74 *N.C. L. REV.* 219, 236–42 (1995).

descriptive matter, they have mostly won.<sup>191</sup> Analysis under the Sherman Act is welfarist in nature, intervention has been infrequent, and consumer welfare has served a dominant criterion for evaluating the legality of trade practices.<sup>192</sup> The question has been whether or not the PSA should be administered with the same lenience. If consumer surplus were the touchstone, then the consolidation of the hog industry, having produced more pork at lower prices, would likely be viewed as benign.

In form, there appears to be less emphasis on consumer surplus under PSA than is the case under the Sherman Act. Case law arising under Section 202 of the PSA prohibits any “unfair, unjustly discriminatory, or deceptive practice or device”;<sup>193</sup> “any undue or unreasonable preference[,] . . . advantage[,] . . . prejudice or disadvantage”;<sup>194</sup> and “any course of business[,] . . . any act for the purpose or with the effect of manipulating or controlling prices, . . . of creating a monopoly . . . or of restraining commerce.”<sup>195</sup> The question that has arisen under this section is whether a violation of Section 202 has occurred if there has been no injury to competition.<sup>196</sup> Most courts have held that an injury to competition must be found in order for an action under Section 202 to be maintained,<sup>197</sup> which makes it harder to bring an enforcement action against some anticompetitive practice. But at least the inquiry focuses on the competition itself, rather than consumer surplus.

In practice, the PSA has not served as much of a restraint on anticompetitive activity in the livestock industry. The Grain Inspection, Packers and Stockyards Administration (GIPSA), and its predecessor, the Packers and Stockyards Administration—agencies charged with administering the PSA and policing anticompetitive practices in the livestock industry<sup>198</sup>—have been uninterested in

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<sup>191</sup> See, e.g., Jonathan B. Baker, *Economics and Politics: Perspectives on the Goals and Future of Antitrust*, 81 FORDHAM L. REV. 2175, 2182 (2013); Herbert Hovenkamp, *Implementing Antitrust's Welfare Goals*, 81 FORDHAM L. REV. 2471, 2471, 2496 (2013).

<sup>192</sup> PHILLIP E. AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION* 124–30 (4th ed. 2014); HERBERT HOVENKAMP, *FEDERAL ANTITRUST POLICY: THE LAW OF COMPETITION AND ITS PRACTICE* 71–73 (1994).

<sup>193</sup> 7 U.S.C. § 192(a) (2012).

<sup>194</sup> *Id.* at § 192(b).

<sup>195</sup> *Id.* at § 192(e).

<sup>196</sup> John D. Shively & Jeffrey S. Roberts, *Competition Under the Packers and Stockyards Act: What Now?*, 15 DRAKE J. AGRIC. L. 419, 430–36 (2010).

<sup>197</sup> *Id.* at 433–34.

<sup>198</sup> *Id.* at 420.

challenging the consolidation of the livestock industry. The PSA was passed at a time in which five meatpacking companies had established an oligopsony<sup>199</sup> and oligopoly<sup>200</sup> (selling cuts of meat to distributors and supermarkets) that had the effect of raising meat prices.<sup>201</sup> In 1991, the General Accounting Office (GAO) noted that the meatpacking industry had become even more concentrated than the oligopsonist and oligopolist conditions in 1921 that gave impetus to the PSA: a mere four firms controlled 70% of the entire meatpacking industry.<sup>202</sup> The GAO had stern words for the Packers and Stockyards Administration.<sup>203</sup> The GAO strongly recommended that in light of the rapidly changing livestock industry, the agency quickly develop programs for monitoring and analyzing livestock industry practices, such as price manipulation and the apportioning of territory among meatpackers.<sup>204</sup> The Packers and Stockyards Administration was not even collecting data on prices.<sup>205</sup>

Six years later, the GAO, in following up on its 1991 report, noted that concentration had increased to 81% in 1995.<sup>206</sup> It reiterated its 1991 recommendations, noting that the newly-formed agency GIPSA “has begun reallocating its resources to place more emphasis on detecting anticompetitive violations,”<sup>207</sup> but that progress was

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<sup>199</sup> *Oligopsony*, BLACK’S LAW DICTIONARY (8th ed. 2004) (“Control or domination of a market by a few large buyers or customers.”). The “Big Five” represented an oligopsony through buying finished livestock for slaughter. *See* Shively & Roberts, *supra* note 196, at 422–23.

<sup>200</sup> *Oligopoly*, BLACK’S LAW DICTIONARY, *supra* note 199 (“Control or domination of a market by a few large sellers, creating high prices and low output similar to those found in a monopoly.”). The “Big Five” represented an oligopoly through selling cuts of meat to distributors and supermarkets. *See* Shively & Roberts, *supra* note 196, at 422–23.

<sup>201</sup> Shively & Roberts, *supra* note 196, at 423.

<sup>202</sup> U.S. GEN. ACCOUNTING OFFICE, RCED-92-36, PACKERS AND STOCKYARDS ADMINISTRATION: OVERSIGHT OF LIVESTOCK MARKET COMPETITIVENESS NEEDS TO BE ENHANCED 3 (1991), <http://www.gao.gov/assets/160/151157.pdf>.

<sup>203</sup> Department of Agriculture Reorganization Act of 1994, Pub. L. No.103-354, §§ 201–96, 108 Stat. 3178, 3209–3238 (1994) (forming The Grain Inspection, Packers and Stockyards Administration (GIPSA) by merging the Federal Grain Inspection Service and the Packers and Stockyards Administration).

<sup>204</sup> U.S. GEN. ACCOUNTING OFFICE, *supra* note 202, at 4.

<sup>205</sup> *Id.*

<sup>206</sup> U.S. GEN. ACCOUNTING OFFICE, GAO/RCED-97-100, PACKERS AND STOCKYARDS PROGRAMS: USDA’S RESPONSE TO STUDIES ON CONCENTRATION IN THE LIVESTOCK INDUSTRY 2 (1997), [hereinafter USDA’S RESPONSE], <http://www.gao.gov/archive/1997/rc97100.pdf>.

<sup>207</sup> *Id.* at 3.

disappointingly slow.<sup>208</sup> Another ten years later, an audit by the USDA Inspector General not only found shockingly little progress by GIPSA in setting up monitoring and data collection systems,<sup>209</sup> but found a treasure trove of new instances of incompetence and indifference to anticompetitive behavior. Out of the listed 1,842 investigations on file, GIPSA could not even identify the *location* of the investigation in 1,799 of those files (apparently, it could with the remaining forty-three).<sup>210</sup> The Inspector General found that the relationship between management and staff was strained, “significantly contribut[ing] to the agency not being able to ensure open and competitive markets for livestock, meat, and poultry.”<sup>211</sup> Shockingly and tellingly, staff economists, who should be at the forefront of an agency charged with analyzing markets, were marginalized and frozen out of investigations into anticompetitive practices and effects on trade.<sup>212</sup> This was true despite the 1997 recommendation that had specifically suggested that economists be brought into the investigative processes and policy.<sup>213</sup>

While the 1994 reorganization that created GIPSA was disruptive, it is hard to explain away the subsequent two-decade-long chaos that has reigned over the agency since. Certainly a trade regulation agency that has marginalized its economists would appear to be one that is uninterested in carrying out its economic mandate. Under the watch of GIPSA and its predecessor agency, the market share of the top four pork packers increased from 40% in 1990 to 66% in 2007.<sup>214</sup> Beef packing is even more concentrated, with the top four producers owning 83.5% of the market in 2007.<sup>215</sup> Three of the top four hog packers are also the top three beef packers—Tyson Foods, Swift & Co., and Cargill—while the top pork packer is the behemoth

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<sup>208</sup> *Id.* at 4–6.

<sup>209</sup> U.S. DEP’T OF AGRIC., OFFICE OF THE INSPECTOR GENERAL, NE. REGION, REPORT NO. 30601-01-HY, AUDIT REPORT: GRAIN INSPECTION, PACKERS AND STOCKYARDS ADMINISTRATION’S MANAGEMENT AND OVERSIGHT OF THE PACKERS AND STOCKYARDS PROGRAMS 5 (2006), <http://www.usda.gov/oig/webdocs/30601-01-HY.pdf>.

<sup>210</sup> *Id.* at 6–7.

<sup>211</sup> *Id.* at 5.

<sup>212</sup> *Id.* at 2–3.

<sup>213</sup> USDA’S RESPONSE, *supra* note 206, at 8.

<sup>214</sup> MARY HENDRICKSON & WILLIAM HEFFERNAN, UNIV. OF MO., CONCENTRATION OF AGRICULTURAL MARKETS (2007), <http://www.foodcircles.missouri.edu/07contable.pdf>.

<sup>215</sup> *Id.*

Smithfield Foods, which slaughters over twenty-seven million hogs per year, good for 26% of the total market.<sup>216</sup>

The legislative history of the PSA suggests that Congress was concerned with protecting *competition*, not consumer surplus.<sup>217</sup> In going beyond the Sherman Act, the PSA can be read as encompassing a broader set of values than just the consumer surplus standards which dominates the Sherman Act jurisprudence.<sup>218</sup> It is true that the Sherman Act has become a welfarist statute despite a legislative history that is lacking any hint of a Congressional welfarist concern.<sup>219</sup> But in passing the PSA, Congress had an important constituency in mind: farmers.<sup>220</sup> Unlike Sherman Act problems, the livestock industry has a long-standing and identifiable group with a vested and articulable interest in competitive markets for their own sake. While “consumers” may be too large and nebulous a group to have a proxy, small farms are not. The existence of small farms throughout the course of passage and amendments of the PSA shows that Congress recognized the interests of this constituency and passed the PSA with that group in mind.

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<sup>216</sup> *Id.*

<sup>217</sup> H.R. REP. NO. 85-1048, at 1 (1957) (“The primary purpose of this Act is to assure fair competition and fair trade practices in livestock marketing and in the meatpacking industry.”).

<sup>218</sup> *Wheeler v. Pilgrim’s Pride Corp.*, 591 F.3d 355, 378–79 (5th Cir. 2009) (Garza, J., dissenting); *Swift & Co. v. United States*, 308 F.2d 849, 853 (7th Cir. 1962); Christopher M. Bass, *More than a Mirror: The Packers and Stockyards Act, Antitrust Laws, and the Injury to Competition Requirement*, 12 DRAKE J. AGRIC. L. 423, 431–32 (2007).

<sup>219</sup> John B. Kirkwood & Robert H. Lande, *The Fundamental Goal of Antitrust: Protecting Consumers, Not Increasing Efficiency*, 84 NOTRE DAME L. REV. 191, 192 (2008) (“The conventional wisdom in the antitrust community today is that the antitrust laws were passed to promote economic efficiency. This view, held by most economists, conservative scholars, federal enforcers, and practicing lawyers, is incorrect. Neither the sole nor even the primary purpose of these laws is, or ever has been, to enhance efficiency. Instead, . . . the fundamental goal of antitrust law is to protect consumers.”). Most sponsors of the Sherman Act were more concerned with the effective wealth transfer from consumers to monopolist producers. Senator George Frisbie Hoar, one of the key shepherds of the Act, complained of “transaction[s] the only purpose of which is to extort from the community . . . wealth which ought . . . to be generally diffused over the whole community.” *Id.* at 202 (quoting 21 CONG. REC. 2461, 2728 (1890)).

<sup>220</sup> H.R. REP. NO. 85-1048, at 16 (1957), reprinted in 1957 U.S.C.A.N. 5213, 5223 (“It is this area which most concerns small packer competitors and various other small business men who are links in the meat business . . . . It is this area which most requires effective regulation.”).

### III WHY SAVING SMALL FARMS MATTERS

The intensification and concentration of agriculture has clearly produced gains for both producers and consumers. A farmer in 1940 did well to harvest seventy to eighty bushels of corn per acre, but corn farmers today routinely harvest two hundred bushels per acre.<sup>221</sup> Livestock farming has seen even more impressive gains. In 1950, chickens took an average of eighty-four days to grow to five pounds; by 2005, that period had shortened to forty-five days.<sup>222</sup> This has translated into savings for consumers: in 1970, the average American spent over 4% of her income on 194 pounds of meat; by 2005, she spent about 2% of her income on 221 pounds.<sup>223</sup> But in addition to increasing air and water pollution and contributing to public health risks, an intensified and concentrated agricultural sector imposes other costs on society that would be avoided by a more diffuse sector that decentralizes production on a larger number of smaller farms.

On one level, saving small farms is just a proxy for reducing the enormous environmental and social costs of large-scale farming. Whether or not small farms could be saved from the rigors of competition, it is worth forcing large farms to internalize the environmental and social costs they impose on society. However impressive are the gains in productivity and profit, they are still eclipsed by the heartbreakingly large number of human deaths, illnesses, and catastrophic health risks, and a large variety of other costs of large-scale farming. The regulatory gaps that allow CAFOs to thrive in such great numbers are egregiously inefficient, in that consumers, if they could choose, would be willing to pay more for meat in exchange for relief from the multitude of problems generated by industrialized agriculture. Moreover, along with exacerbating environmental and social ills, we are destroying a much more benign model of food production and losing the human and social capital that is required to maintain it. There are significant irreversibilities in going down this path.

Conglomerates have essentially become more efficient by substituting capital for labor, employing fewer people at the local level, and substituting some different management techniques that save on labor costs. What little labor industrialized agriculture adds is

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<sup>221</sup> PEW, *supra* note 6, at 3.

<sup>222</sup> *Id.* at 5.

<sup>223</sup> *Id.* at 3.

apt to reside in some central headquarters where complex decisions are made regarding inventory, flow, feedstock, and other factors that are efficiently woven together. But this concentration of productive inputs away from the individual and toward the centralized conglomerate reduces the demand for labor at the local level and the human capital traditionally required to farm.<sup>224</sup> There may be a great many other factors, but as large employers in agricultural communities, farms clearly exert an influence on employment patterns.<sup>225</sup> There is no doubt that one of the efficiencies realized by large conglomerates is the ability to pay fewer people at the local level. To a great extent, this is the normal evolution of an industry as it reduces costs. There is no denying that more people have more access to meat now than was the case just a few decades ago. However, a hidden cost in the process is the loss of social and human capital in those rural agricultural communities.<sup>226</sup>

The human capital of farming on a small scale may seem anachronistic, but it remains a vital part of a functioning economy. The groundbreaking human capital scholar Theodore Schultz noted that farmers made extremely efficient utilization of the technologies available to them.<sup>227</sup> In Schultz's 1979 Nobel Prize lecture, *The Economics of Being Poor*, he denounced what he perceived as the widespread condescension toward farmers: "People who are rich find it hard to understand the behaviour of poor people. Economists are no exception, for they too find it difficult to comprehend the preferences

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<sup>224</sup> See generally STAFF OF S. SPECIAL COMM. TO STUDY PROBLEMS OF AM. SMALL BUS., 79TH CONG., REP. ON SMALL BUSINESS AND THE COMMUNITY: A STUDY IN THE CENTRAL VALLEY OF CALIFORNIA ON EFFECTS OF SCALE OF FARM OPERATIONS (Comm. Print 1946) (discussing a time-tested and still-debated study of rural welfare and farm size); Linda M. Lobao et al., *Still Going: Recent Debates on the Goldschmidt Hypothesis*, 58 RURAL SOC. 277 (1993) (comparing recent studies with the Goldschmidt report). But see Donna Barnes & Audie Blevins, *Farm Structure and the Economic Well-Being of Nonmetropolitan Counties*, 57 RURAL SOC. 333, 344–45 (1992) (focusing on the relationship between farm structure and county agricultural dependency).

<sup>225</sup> See generally Linda M. Lobao & Michael D. Schulman, *Farming Patterns, Rural Restructuring, and Poverty: A Comparative Regional Analysis*, 56 RURAL SOC. 565 (1991) (examining the implications of rural economic organization on poverty).

<sup>226</sup> PEW, *supra* note 6, at 43.

<sup>227</sup> THEODORE W. SCHULTZ, TRANSFORMING TRADITIONAL AGRICULTURE 3 (1964); Will Martin & Devashish Mitra, *Productivity Growth and Convergence in Agriculture Versus Manufacturing*, 49 ECON. DEV. & CULTURAL CHANGE 403, 404 (2001).



and scarcity constraints that determine the choices that poor people make.”<sup>228</sup>

Being a farmer not only requires hard physical labor, but also requires underappreciated ingenuity in the face of binding economic constraints and a great deal of inherent commodity risk.<sup>229</sup> For decades, fewer people have chosen this line of work.<sup>230</sup> To be sure, the migration of jobs and people from agricultural communities has a multitude of macroeconomic causes well beyond the scope of this Article that have nothing to do with concentration in agriculture.<sup>231</sup> But the rise of industrialized agriculture is *predicated* on the replacement of the human capital of traditional farming, which is a substantial source of the cost savings.<sup>232</sup> CAFOs with market power drive down the wages that need to be paid to contract growers, who no longer make the farm management decisions.<sup>233</sup> But this model of agricultural production ignores a wide variety of broader societal considerations, reviewed in this Article and externalized by large agricultural conglomerates.

Additionally, agriculture’s march toward concentration will destroy the social capital resident in traditionally agricultural communities. Social capital is the network of interpersonal and intra-organizational bonds that are formed through cooperation or expected cooperation. Robert Putnam’s pioneering *Bowling Alone*, argues that social capital enhances political and civic life without consciously having these outcomes as objectives.<sup>234</sup> But possibly even more important, social

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<sup>228</sup> Theodore W. Schultz & Sir Arthur Lewis, Prize Lecture, The Economics of Being Poor, Nobel Prize Lecture (Dec. 8, 1979) (transcript available at NOBELPRIZE.ORG, [http://www.nobelprize.org/nobel\\_prizes/economic-sciences/laureates/1979/schultz-lecture.html](http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1979/schultz-lecture.html)).

<sup>229</sup> David G. Abler & Vasant A. Sukhatme, *The “Efficient but Poor” Hypothesis*, 28 REV. AGRIC. ECON. 338, 339 (2006).

<sup>230</sup> DIMITRI ET AL., *supra* note 1, at 3; John E. Bregger, *Measuring Self-Employment in the United States*, 119 MONTHLY LAB. REV. 3, 4 (1996).

<sup>231</sup> See generally Wallace E. Huffman, *Farm and Off-Farm Work Decisions: The Role of Human Capital*, 62 REV. ECON. & STAT. 14 (1980) (discussing the implications of education levels on off-farm labor supplies of farmers); Robert Tamura, *Human Capital and the Switch from Agriculture to Industry*, 27 J. ECON. DYNAMICS & CONTROL 207 (2002) (explaining technology’s role in the transition of human labor from agriculture to industry).

<sup>232</sup> Another source of savings is the mechanization, the replacement of farm animals with machines such as tractors. DIMITRI ET AL., *supra* note 1, at 3.

<sup>233</sup> PEW, *supra* note 6, at 42.

<sup>234</sup> ROBERT D. PUTNAM, *BOWLING ALONE: THE COLLAPSE AND REVIVAL OF AMERICAN COMMUNITY* 336–49 (2000).

capital can play a vital role in increasing productivity<sup>235</sup> in poor, resource-based communities such as fishing communities.<sup>236</sup> In poor, resource-based communities that lack either physical or human capital, social capital provides valuable informational benefits, lubricates mercantile relations, and dispenses with the need for expensive and perhaps futile monitoring.<sup>237</sup> To the extent that large agricultural conglomerates are drying up agricultural communities,<sup>238</sup> they are wasting this reserve of social capital.

Finally, there is one more vital role for small farms that must be preserved: the presentation of choice to consumers. With almost 90% of chickens produced under contract and 90% of hogs slaughtered by large plants,<sup>239</sup> it has become increasingly difficult for meat consumers to obtain meat that is anything but low-quality, low-cost, and produced under poor conditions. Markets for premium meat products exist, but are consigned to niche market status.<sup>240</sup> It is important to learn lessons from concentration in other industries that have consolidated and generated tremendous consumer displeasure. Complaints about commercial air travel in an industry dominated by three legacy carriers has only increased<sup>241</sup> as the industry marches

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<sup>235</sup> See Kenneth J. Arrow, *Observations on Social Capital*, in SOCIAL CAPITAL: A MULTIFACETED PERSPECTIVE 3–5 (Partha Dasgupta & Ismail Serageldin eds., 2000); Robert M. Solow, *Notes on Social Capital and Economic Performance*, in SOCIAL CAPITAL: A MULTIFACETED PERSPECTIVE 6–9, *supra*.

<sup>236</sup> PUTNAM, *supra* note 234, at 359 (“Historically social capital has been the main weapon of the have-nots, who lacked other forms of capital.”); James M. Acheson, *The Maine Lobster Market: Between Market and Hierarchy*, 1 J.L. ECON. & ORG. 385, 385–86 (1985); Sean R. Lauer, *Entrepreneurial Processes in an Emergent Resource Industry: Community Embeddedness in Maine’s Sea Urchin Industry*, 70 RURAL SOC. 145, 146 (2005); James A. Wilson, *Adaptation to Uncertainty and Small Numbers Exchange: The New England Fresh Fish Market*, 11 BELL J. ECON. 491, 503–04 (1980).

<sup>237</sup> James S. Coleman, *Social Capital in the Creation of Human Capital*, 94 AM. J. SOC. S95, S99 (1988).

<sup>238</sup> Rural areas have always tended to be poorer than urban areas, but studies suggest that agricultural communities with CAFOs are *poorer* than those without. See E. Paul Durrenberger & Kendall M. Thu, *The Expansion of Large Scale Hog Farming in Iowa: The Applicability of Goldschmidt’s Findings Fifty Years Later*, 55 HUMAN ORG. 409, 413 tbl.4 (1996) (showing higher rates of food stamp participation in CAFO communities than agricultural communities without).

<sup>239</sup> PEW, *supra* note 6, at 21–22.

<sup>240</sup> M.S. Honeyman et al., *The United States Pork Niche Market Phenomenon*, 84 J. ANIM. SCI. 2269, 2269 (2006).

<sup>241</sup> Ismat Sarah Mangla, *Complaints About Airlines Reach 13-Year High, Says DOT*, INT’L BUS. TIMES (Mar. 6, 2015), <http://www.ibtimes.com/complaints-about-airlines-reach-13-year-high-says-dot-1812966>.

towards a duopoly. If livestock conglomerates are following the example of the commercial airlines, they are clearly misguided, to say the least. But the greatest costs will take the form of lost consumer surplus resulting from the loss of choice.

Saving small farms matters because agricultural production by large agricultural conglomerates carries many different price tags, each too high for the value it adds. Saving small farms also matters because it is important to maintain an agricultural industry that is robust, diverse, and healthy. Small is not *necessarily* beautiful, or healthier, or environmentally better, but small, traditional farms are much less likely to impose the scale externalities imposed by large farms.

### CONCLUSION

It would appear that wealth and power in the agricultural sector has become increasingly concentrated, much the way that wealth has concentrated generally in most developed economies. The external costs imposed by large agricultural conglomerates, and hog CAFOs in particular, are shocking and should be a policy reform priority. Hog CAFOs are a bane of any community: they cause property devaluation of land within several miles, they pollute water in unacceptable quantities, and they pollute air enough to pose a significant threat to public health. It is disgraceful that regulators have allowed CAFOs to impose these health risks upon the broader public and allowed them to incubate the development of antibiotic-resistant bacteria and zoonotic viruses.

This Article emphasizes not just the externalities of CAFOs, but the broader question of what kind of industry structure best serves both consumers and the general public. Industry concentration commonly increases consumer surplus. But this is a very narrow benefit. A variety of other social and environmental considerations belong in the calculus of any production decision—in any industry. The problem with industry concentration, and particularly the concentration of hog CAFOs, is that the parsimony of cost minimization has driven out all other considerations, many of them vastly more important than just consumer price.

What kind of an agricultural industry can better internalize its social and environmental costs? It would be a trap to romanticize the bucolic farm life. Agricultural communities have always been poor, and college-educated individuals have always been less common on farms than in other places in American industry. But this is a social

construct: low commodity prices means low pay, which means that young workers have a higher payout if they leave the farm to pursue higher education. What this social construct elides is the need to produce food without also producing a panoply of other problems. That is a more demanding task, one which requires a more developed human capital, building on an existing base of farming knowledge that already embodies far more wisdom in environmental stewardship than agricultural conglomerates possess. And yet, more is required to place agriculture in a larger social context of a more complex menu of needs other than just food provision. Reform of public policy to avoid excusing environmental, health, and economic harms arising from agricultural practices would represent a much-needed start to the long but necessary process of reassembling an agricultural industry that has lost its way.

